OCTOBER, 1957

FOOD ENGINEERING

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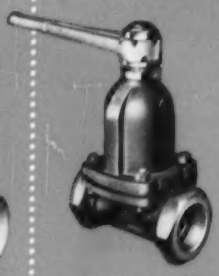
OUTSTANDING NEW FOOD PLANTS...Special Report

ALL-PURPOSE VALVE

for handling materials as diversified as corrosive fluids, gases, beverages, viscous materials, foods, compressed air, solids in suspension.

Handwheel Operated



Lever Operated

Power Operated

Grinnell-Saunders Diaphragm Valve

Unsurpassed on lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors.

In industries as varied as mining, food, textile, pulp and paper, beverage, water and sewage, chemicals . . . Grinnell-Saunders Diaphragm Valves continue to win enthusiastic acceptance. The unique design of the valve — with its flexible, long-wearing, tight-closing diaphragm — offers many unusual advantages.

If you have a valve problem, it will pay you to write Grinnell for further information.

Choice of Materials

Bodies — iron; cast steel; stainless steel; Durimet 20; Hastelloy A, B, C; bronze; Monel; aluminum; PVC (polyvinyl chloride); Saran

Body linings — hard rubber; soft rubber; neoprene; glass; lead; plastics; Heresite; Lithcote

Diaphragms — soft natural rubber; natural rubber; white synthetic rubber; neoprene; reinforced neoprene; butyl; Hycar; Teflon; Kel-F; PVC (polyvinyl chloride); polyethylene

Bonnets — iron; stainless steel; bronze; other materials on special order

Choice of Bodies

Conventional weir type

Straight bodies — screwed; flanged; socket weld; butt weld; socket (solder); sanitary threads; hose ends; Victaulic

Angle bodies — screwed; flanged; socket weld

Other types

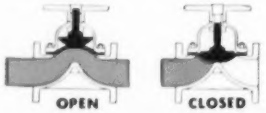
A line of Straightway Valves (for straight-thru flow) and Full-Bore Valves (for ball brush cleaning) also are available

Choice of Bonnets

Handwheel (non-indicating stem, indicating stem); chain wheel; lever (for quick operation); sliding stem (for a wide selection of power operated topworks)

Operating Features

- diaphragm absolutely isolates bonnet mechanism from the fluid in the line
- diaphragm lifts high for streamline flow in either direction
- diaphragm presses tight for positive closure
- simple maintenance — diaphragm easily replaced without removing valve body from line



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Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

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Delivery of meat pies to far-flung, off-route stations solved by special company truck.

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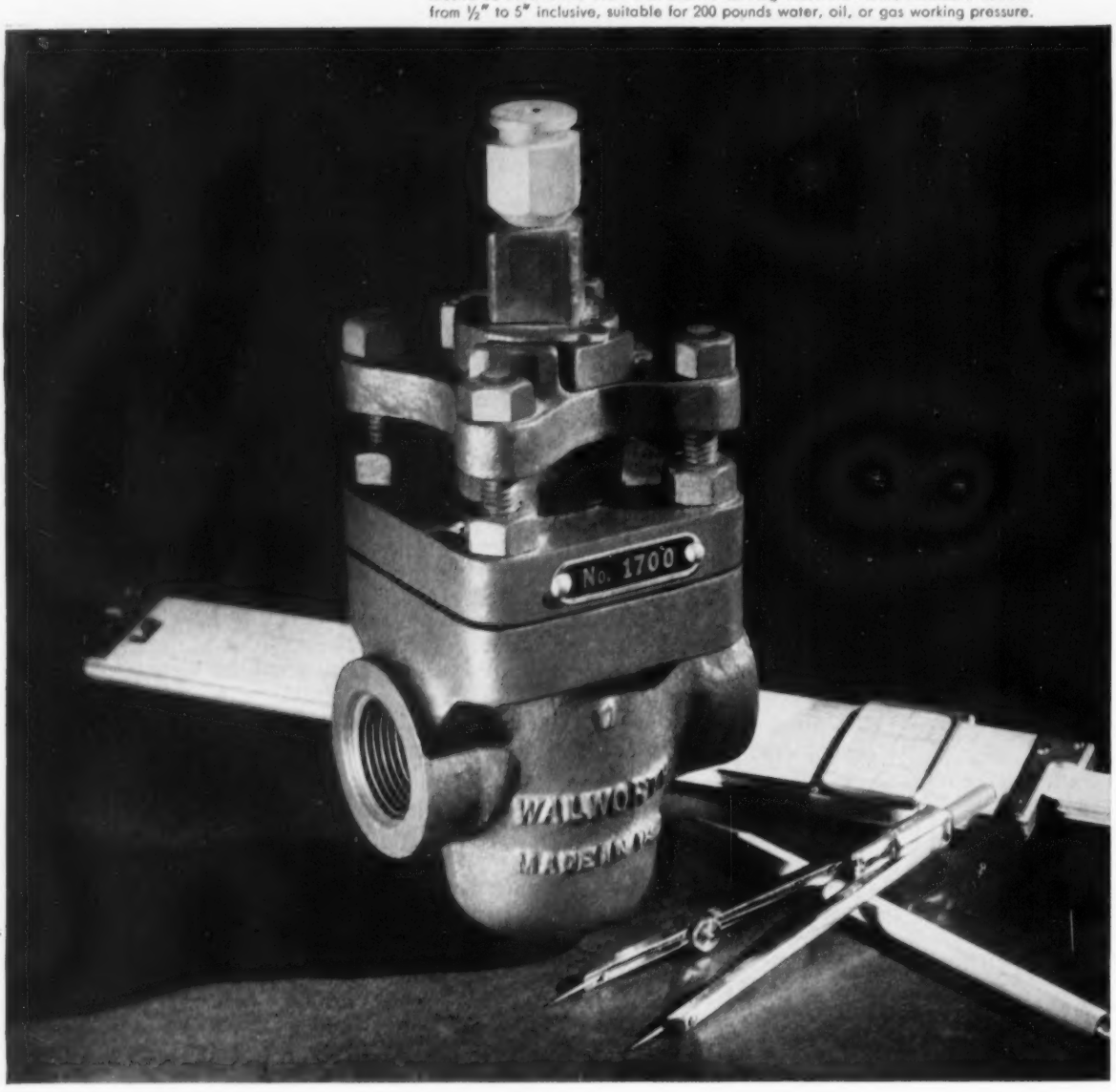
Illustrated here is the Walworth Lubricated Plug Valve No. 1700, available in sizes from ½" to 5" inclusive, suitable for 200 pounds water, oil, or gas working pressure.



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Remember, you can get Walworth LPV's in all sizes . . . from ½ to 30 inches . . . for pressures up to 5000 psi and for vacuum service . . . in a number of different styles and patterns. For more information about LPV's and for your copy of the new Walworth LPV Circular, see your local Walworth Distributor.

*Lubricated Plug Valves

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Outstanding Food Plants . . .

. . . get the spotlight in this month's Special Report—20 pages, starting on p. 105.

Covered here are such non-operating features as their location, layout and construction, electrical and plant services, sanitation and waste disposal, quality control, and warehousing.

Will electronics end old-style plant storage? That's nearly the case right now in one bakery premix operation—where fully four-fifths of the output routes directly from packaging to shipping on conveyors controlled by a punch-tape 'memory' system (see p. 67).

Canning that's faster, better, less costly is the dividend on a vari-product line featuring built-in flexibility (see foldout flowsheet, p. 146).

Special, too: The revolutionary film-packing of an age-old product—smoked fish (p. 71), and the big role of sanitary flowmeters in the strides toward automatic operations (p. 72).

Also: More on working your complex problems the electronic-brain way (p. 84). And your best tactics if FDA "calls you on the carpet" (p. 92).

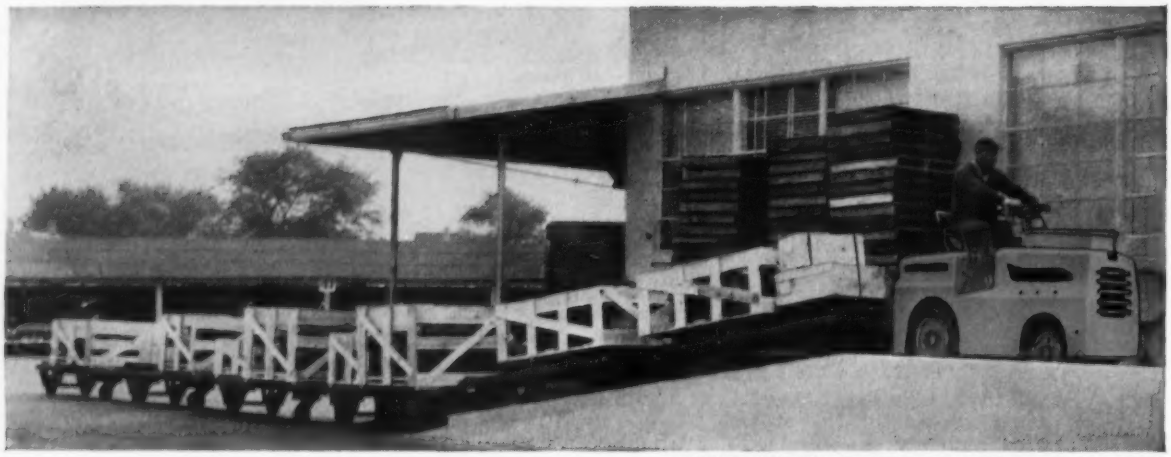
Coming—More on Marketing

Operating a food manufacturing business successfully requires more than efficient production and packaging. In this complicated and extremely competitive field, better marketing performance is now a must.

Food company management now is casting as sharp an eye on this area as on factory performance. And significant changes are being made.

So future FE issues will keep you abreast of changing times in the marketing phase of food manufacturing—just as it does in plant operations, packaging, and engineering.

COVER PHOTOS . . . Show three of the seven outstanding new food plants covered in our Special Report starting on p. 105. Top left: Carnation Co., Seattle. Top right: Carling Brewing Co., Natick, Mass. Below: Heinz, Tracy, Calif. (Photo of Carling plant by Arnold T. Arnold, courtesy Plastichrome, Boston).



DYNAMOTIVE Tractor above "walks away" with 19,225 lb. load up 12% grade at Robbins & Myers plant.

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TRENDS & FORECASTS

Special

FOOD ENGINEERING

Service to Executives

General business outlook remains good. Expansion of consumer purchasing promises to more than offset cutbacks in defense spending. This forecast by McGraw-Hill's economist points to good food business.

Cost of food manufacturing equipment increased 8% last year and will be up another 5% by end of 1957, an FE survey indicates. Principal reasons are higher labor rates, metal prices, and engineering costs.

World food production gained 3% in 1956, slightly outpacing population growth. But FAO expects same output into 1958, while population gains 1.6%. Higher incomes are boosting consumption in a few countries.

Consumers spent a high 28% of their dollars for food in second quarter of 1957, according to Department of Commerce. So trend to live better comestibly continues upward.

Canners and freezers suffered from oversupplies in 1956-57 fiscal year. Result: Unfavorable prices in face of higher costs. Smaller supplies are expected to improve next year's picture.

Notable progress in specialty foods is seen in 75% increase in size of recent New York show compared to first one three years ago. And General Foods' entrance into field is expected to give it a significant boost.

Food manufacturers bought $161 million of chemical additives in 1956. They spent (in millions), $41.1 for flavoring agents; $39.7 for phosphates and acidulants; $38 for thickeners and emulsifiers; $12 for nutritional supplements; $11.4 for spoilage inhibitors; $5 for colors; $1.5 for sweeteners; and $12.6 for miscellaneous.

Cites Challenging Trends

The more Americans make, the more they eat. In 1955, with disposable personal income at $270 billion, consumers spent $76 billion for food, or 28.1% of disposable income.

In 1956, income rose to $287 billion and food expenditures $80.7 billion—again 28.1% of income. This year, income is estimated at $298 billion, and food spending at $84.4 billion.

If disposable income remains high, the food sales outlook for 1958 should exceed $89.5 billion.

That is the forecast presented by Robert H. Perlitz, vice-president of Consolidated Foods Corp., at the Marketing Conference of National Industrial Conference Board on September 19.

Many pertinent factors were cited by Mr. Perlitz:

We're experiencing a veritable explosion in our population. With 8,000 new mouths being added every day, our U.S. population in 1958 should reach 173,000,000.

The number of households is increasing at the rate of nearly one million a year.

Dependents (people under 15 or over 65) will increase twice as fast as our total population between now and 1965.

Demand for Convenience

The labor force will grow less rapidly. This should lead to the expanded employment of women workers, who now comprise 32% of our labor force—an all-time high. Over 12 million of the 22 million

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New types of Patapar provide an absolute barrier to grease and oils

Revolutionary new types of Patapar Vegetable Parchment completely resist penetration. Grease and oils will not spread on its surface. There is no "crawl" — no tendency of wetting by oils.

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Available in several hundred types, Patapar fills an amazing range of needs. Applications include: food wrappers; inner grease-proof ply for multi wall bags and fiber drums; liners for box board food containers; packaging oiled machine parts; industrial filter papers.

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Trends & Forecasts

women workers are married. Working wives and mothers are great buyers of convenience foods.

In 1958, the labor force will reach 70 million. This high level of employment will create more demand for convenient, attractively packaged prepared foods.

The big leisure market lies among workers. More outdoor living and cooking by this "leisure mass" will exert a marked influence on types of food purchased and manner of preparation.

Retail Setup Shifts

There have been many dramatic trends in food retailing.

Last year 27,100 supermarkets (2,400 more than in 1955) controlled 62% of the nation's $42.5 billion grocery store sales. The nation's 70,000 superettes accounted for 28% of total food store dollar sales in 1956. Only 10% of the total dollars sales are done by 212,900 small food stores.

Another important trend is the spectacular sales growth since 1948 by the so-called "affiliated independents," made up of cooperative retailers and voluntary group retailers. These did 44% of total U. S. grocery sales in 1956, compared with 37% for chains and 19% for independents. In 1958 they may enjoy an even greater share of market.

Revolution in Wholesaling

The growth of the "affiliated independents" has brought about a "wholesaling revolution." Wholesalers who have concentrated on integrating themselves with their retailer customers have made phenomenal gains since 1948.

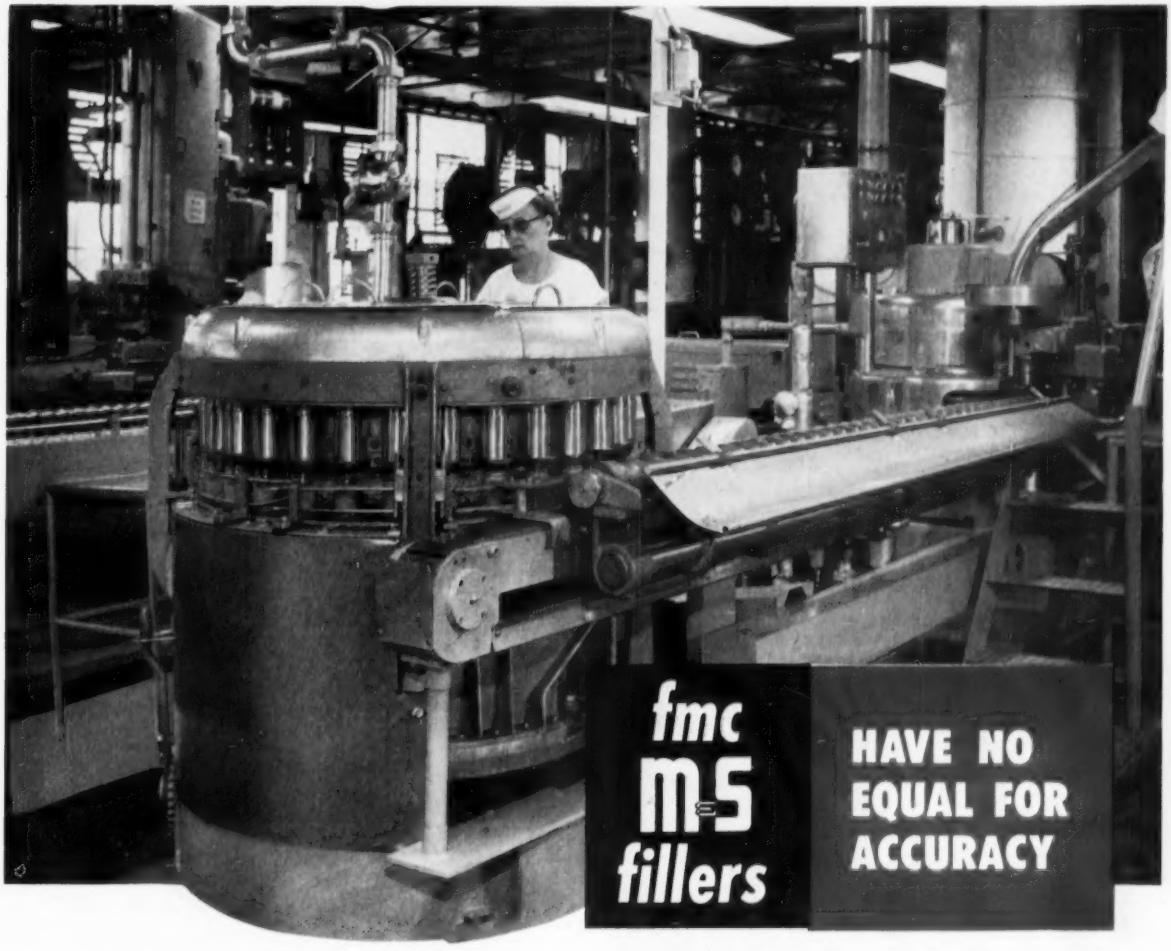
The grocery manufacturer, like the wholesaler, is also becoming more closely allied with retailing. And as we move into 1958, we can expect a greater tendency on the part of manufacturers to help retailers serve consumers better.

Competition is currently terrific and will continue that way throughout 1958. Shelf space is at a premium. Back in 1930 a good store handled about 800 items. Today, the average-sized supermarket carries nearly 5,000 and many carry 7,000 or more.

Eating Habits Change

Changes in American eating habits provide another major headache for food stores. Americans are demanding more convenience, more quality. According to USDA, the

M&S 30 Pocket Filler combines high speed and accuracy filling baby foods at Beech Nut's Rochester, New York plant.



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3. **High Speed Operation.** The M & S line includes fillers in every speed range—equalling the speed of latest cappers and closing machines—with no sacrifice in accuracy. The new, exclusive FMC "No can—No fill" mechanism for each valve, is now available for high speed operations.
4. **Sanitary by Design.** Available in stainless and non-corrosive type contact materials to meet your specific needs. Quickly dismantled for easy cleaning.

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It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

313 WILSON, SO. NORWALK, CONN.

apparent civilian per capita consumption in 1956 represented these percent changes for some leading food groups (as compared with the 1947-49 averages):

Frozen fruits and juices	up 169%
Frozen vegetables	up 157%
Turkey, ready to cook	up 69%
Chicken, ready to cook	up 26%
Canned fruit	up 19%
Canned vegetables	up 9%
Breakfast cereals	up 7%
Fresh fruit	down 23%

The growing number of babies and youngsters as a percentage of our population can well forecast a still greater increase in the potential of food products tailored especially to their needs. These foods enjoy a "bonus sale" because they also fit the requirements of the growing group of "oldsters" in the U. S.–65 years of age and over.

In addition, the 75 million weight-watchers in the U.S., including those that must have special foods for health purposes, have produced startling sales increases in low-calorie diet foods.

$20 Billion Institutional Sales

Eating out continues to grow at very close to a billion dollars annually, and in 1958 institutional volume should push the $20 billion mark.

Surprisingly, more than half of the volume feeding market, about 54%, is comprised of establishments whose primary function is *not* that of serving meals–schools, hospitals, hotels, clubs, drug and department stores, armed services, employee feeding, etc.

Less than half, about 46%, of the nation's volume feeding, is done in independent restaurants, cafeterias, and at lunch counters.

Sees 6 to 8% Increase in '58

Now, to the overall food sales outlook for 1958: The normal increase pattern for sales in the last few years has been about 5% per year. It appears that we are now in a stage of mild inflation in the food business, as prices at this point are about 3% higher than in 1956. If this continues in 1958, we can expect a total increase in overall food sales in the area of 6 to 8%.

Since personal consumption expenditures for food in 1957 are running at the rate of about $84.4 billion, a 6 to 8% increase in 1958 would raise these expenditures to a figure somewhere between $89.5 and $91.1 billion–an all-time record.

LOW-COST PRODUCT PROTECTION

For over forty-five years **NULOMOLINE®**–the *pioneer* invert sugar – has been used as a "BALANCING" ingredient by Bakers, Candymakers, Syrup Processors, Fruit Preservers . . . in frozen foods, desserts, icings, toppings, spreads, and other food preparations.

NULOMOLINE is hygroscopic . . . attracts, retains, and equalizes distribution of moisture . . . retards crystallization . . . increases osmotic pressure . . . stabilizes density of syrup portion . . . resists fermentation . . . controls texture and consistence . . . promotes product uniformity . . . improves taste and appearance.

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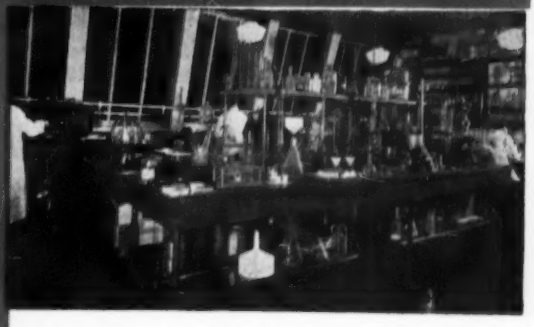

Packed in large and small containers– in tank wagons and tank cars.

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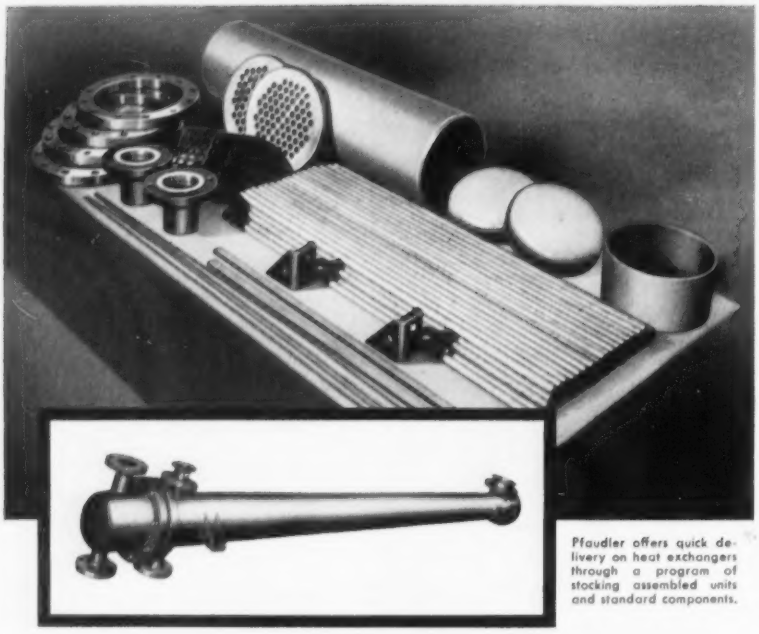

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Would *two-week* delivery help you decide where to buy a heat exchanger?

Look then to Pfaudler, where off-the-shelf delivery can solve many of your process problems in two weeks.

This stocking program applies to tube side 316 stainless steel heat exchangers with carbon steel shell in single- and double-pass, fixed tube sheet design. Capacities include 56, 104, 149, 216 and 316 sq. ft. Other standard FTS sizes up to 20″ shell diameters are quickly assembled to your specifications in approximately four to six weeks.

Pfaudler also stockpiles a complete line of flexible standard *components*, permitting quick delivery on many sizes of packed floating head, internal floating head and "U" bundle design types.

If your needs can't be met with standard stainless steel units, Pfaudler offers heat exchangers of many different alloys. Included are nickel, Inconel, monel, titanium, zirconium, Hastelloy, karbate and combination units of karbate and glassed steel, or glassed steel and alloy construction.

Call on Pfaudler's design department to help you solve your heat transfer problems. They'll be glad to give you the benefit of years of experience in the process industries not only with heat exchangers but other integrated Pfaudler process equipment.

New Heat Exchanger Bulletin

Bulletin 949, just off the press, contains 28 pages of informative data on Pfaudler's flexible standard and custom-built heat exchangers including applications, types available, design specifications and operating characteristics. Check coupon.

THE PFAUDLER CO., Dept. FE-107, Rochester 3, N. Y.

Please send Bulletin 949 on ☐ Heat Exchangers and the Following Additional Food Processing Equipment by Pfaudler: ☐ Conical Dryer-Blender ☐ Tanks—Mixing and Storage ☐ Titan Superjector ☐ Fillers—Rotary Piston and Gravity Types ☐ Evaporators—Film Type ☐ Mills—Wet Grinding.

Name _____ Title _____

Company _____

Address _____

City _____ Zone ____ State _____

Trends & Forecasts

Canadian Foods Gain 6.3%

Sales of Canadian foods and beverages jumped to $824 million in first-quarter of 1957, from $775 million in like period of 1956. And net earnings rose to $52 million from $51 million last year, according to Canadian government reports.

Profits before taxes for the industry remained at $35 million in first-quarter, or the same as last year. Income tax liabilities also stayed at $16 million, so profits after taxes continued at $19 million.

HORS D'OEUVRES

▶ **The "typical" company president earns $68,000 a year, but works so many hours every week that he neglects his family and his recreation, AMA finds. If you feel sorry for him, you're not working hard enough on your own job.**

▶ **Heinz has teamed up with RCA in a national promotion venture—a record album for $1 and 4 soup labels. Foods for body and soul join hands as the dish dances away with the spoon.**

▶ Know what's a ubiquitous comestible? It's margarine wrapped in hidden persuaders for those who eat butter.

▶ **The tempting aroma from roast chicken contains at least 18 chemicals, researchers have discovered. When FDA hears this, it'll want to legislate.**

▶ The Army spends $1.02 a day to feed an enlisted man. Hardly a market for gourmet foods.

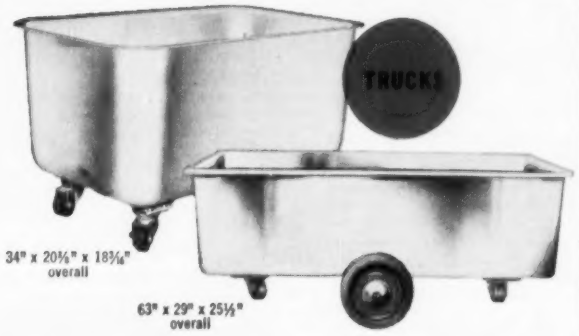
▶ **Gooseberry jam recently taken from a 1911 Antarctic cache tasted more like gooseberries than the modern product. And that, we'd say, indicates progress.**

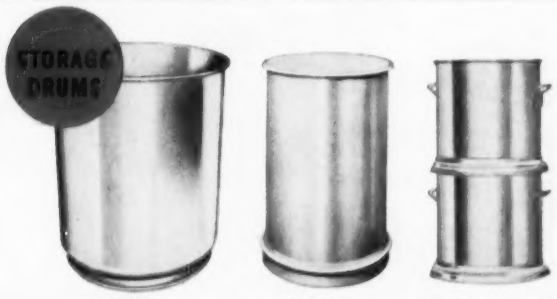
▶ That 1.3 billion meals were eaten out-of-doors this past summer is a measure of fine living. But in times past it would have meant that a lot of people didn't have roofs over their heads.

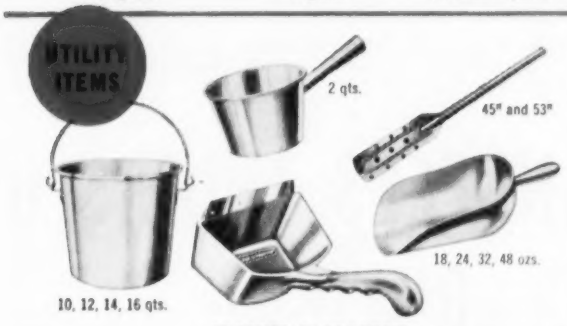
▶ **Chemists tell us that there are more possible proteins than there are stars in the universe. And we're supposed to eat a balanced diet? Heavens!**

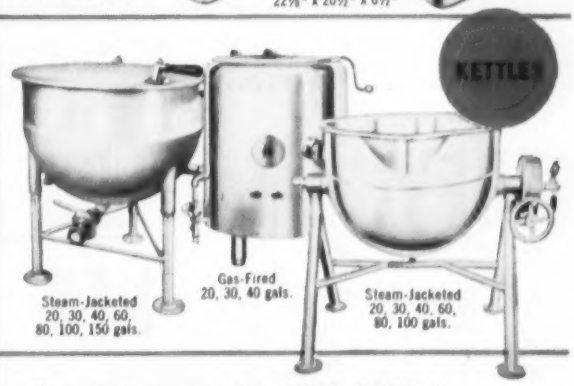
Leaders in Aluminum... for the *FOOD* Industry

WEAR·EVER ALUMINUM









Want to speed production? Simplify your handling or storage problems? Standard, readily available items like these may be your answer.

All Wear-Ever plant service items are made from a specially developed, tough, hard-wrought aluminum alloy to assure long service life.

Send for your copy of our catalog showing the full Wear-Ever line.

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The Aluminum Cooking Utensil Company, Inc.
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GENTLEMEN: *I'd like to learn more about ways in which Wear-Ever's line can help me.*

☐ Send me your catalog ☐ Have your representative see me

NAME_____

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THE ALUMINUM COOKING UTENSIL CO., INC., NEW KENSINGTON, PA.

SHELL CHEMICAL CORP.—Working in the processing area of this huge Shell plant, a Clarklift rushes boxes of synthetic rubber to shipping area. Commented the foreman, "I like this truck for a lot of reasons but mainly because it's fast and easy to operate . . . especially in tight areas."

HERE'S WHAT LOS ANGELES THINKS OF THE NEW CLARKLIFT

There's a gold rush of industrial growth here in Los Angeles. Last year, 123 new industries entered the area—$344 million was invested in industrial expansion.

Although this remains a land of sunshine and relaxation—there's a rush for ultimate efficiency in operation. Any method that will cut overhead and operating costs looms in importance. It's why eyes opened wide when the new Clarklift came West.

For Clarklift is news to efficiency-minded management. From the marvel of a longer wheel base with a *shorter turning radius*, to the speed and convenience of finger-tip controls, the Clarklift offers more practical design innovations than a half-century of fork truck development has produced.

Superintendent Orovic of American Hardwood Company summed up the general opinion with, "We needed a lift truck that could keep pace with our growing business. We looked over the whole field . . . decided the Clarklift line was our best dollar investment."

How about your company? For details call your local Clark dealer or write us direct. On request, we'll arrange a demonstration in your plant.

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 14, Michigan

CLARK EQUIPMENT

CLARKLIFT is a trademark of Clark Equipment Company

SIGNAL TRUCKING SERVICE LTD.—"We have over 880 pieces of equipment in operation—we handle thousands of rail cars a year," said John E. Carroll, Jr., Vice President. "Of necessity, we depend heavily on fork trucks. That's why we bought these new Clarklifts. They're outstandingly dependable, easy to operate, and what's more, our local Clark distributor gives us excellent and reliable service."

SMART & FINAL IRIS CO.—"High product damage could be disastrous in our business—after all we handle over 17 million cases of food and sundry items a year," commented John C. Woods, Vice President. "That's why we like our Clarklifts . . smooth, safe controls—much faster lifting speeds. Efficiency like that saves us dollars."

LOCKHEED AIRCRAFT CORP. "Jet engines are heavy, but delicate. That's why the precise inching and sensitive controls of this truck are important to us."

AMERICAN HARDWOOD COMPANY. "Sure I like this truck—best one I have ever driven," commented the driver. "It's easy to drive, easy to get on and off and there's no clutch pedal. I have to move a lot of lumber in a day—this Clark truck makes it simple to do."

"J&L phosphatizes ***in-the-round?***
. . . you mean after the shell
is formed and welded?"

"Sure, how else can you properly
phosphatize the ***seam?***
J&L gives us a 100% job!"

- J&L specialists, backed up by modern research, are ready to consult on your toughest packaging problems.
- J&L, an integrated steel producer, controls container quality from start to finish.
- J&L steel containers provide engineered packaging for dependable transportation and safe storage.
- Precise fabrication and correct specification of fittings and closures.
- Prompt dependable delivery from nine plants.

Call your nearest J&L Container Division office for recommendations on your packaging problems. Or write direct to the Container Division, 405 Lexington Avenue, New York 17, N. Y.

STEEL **Jones & Laughlin**

...a great name in steel

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DEVELOPMENTS TO WATCH

Special

FOOD ENGINEERING

Service to Executives

Expect passage of food additive legislation next year, perhaps early in the Congressional session. Opportunity looks promising for enactment of a simple, sound, NCA type of bill if industry continues to support it.

More than 100 irradiated foods have been cleared for human testing by Army. Bacon, green beans, and peaches have withstood one-year storage at 72 F. Others are under study. Meat dishes look promising. Insect deinfestation in dried fruit, flour, and cereal bars is being investigated.

"Ultimate" in process control is computer-directed automation. It can, for example, feed varying proportions of different grades of materials to most economically produce product meeting established specifications.

Over 80% of production is shipped from "live" storage in a premix plant, the remainder being efficiently warehoused. New automation tools do it, including punched-tape memory units.

Coming is high-speed machine for packaging foods in either blister packs on cards or in high-density polyethylene cups with poly covers. Both types of packages can be produced simultaneously on same multiple-line machine.

Pats of butter are packed in one-portion pouches on a high-speed machine. Butter pieces are placed on cellophane web, covered with a second web, then the film is heat sealed around pats and cut into strip-packs.

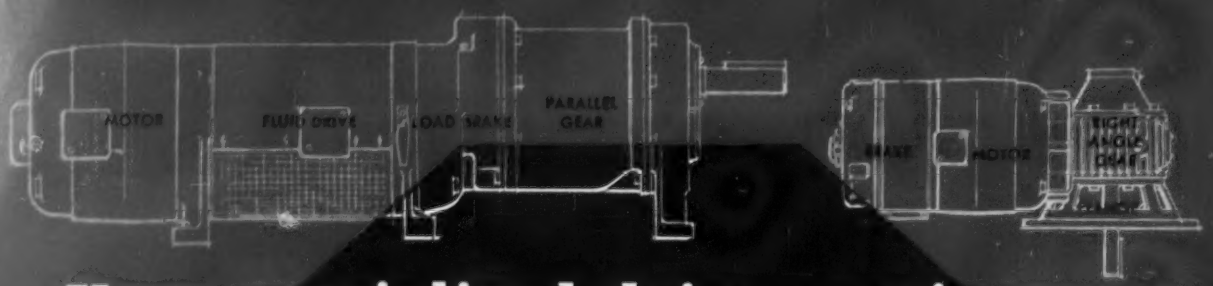
Leaky cans are automatically rejected (after holding 2 days) by height-of-fill X-ray unit. Used by packer of modified milk for infants, the method saves 21-day delay for incubation test and 4-man reinspection.

Accuracy and speed of ingredient batching are boosted by new punched-card, electronic weight-proportioning system. Formula changeover is easy; and formulas are kept confidential. Will be in food plants soon.

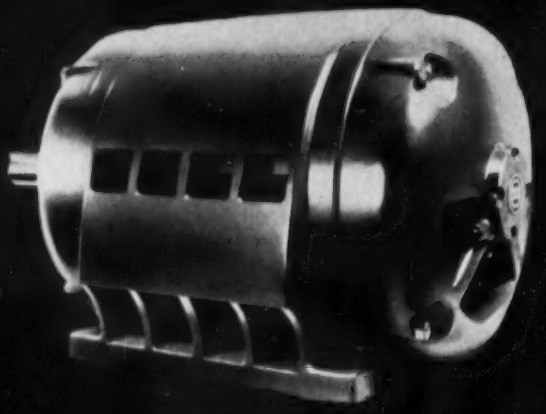
Dietetic frozen dinners have been introduced by Ocoma. Beef, turkey, and fried chicken dishes contain 290, 230, and 490 calories, respectively—about half the usual counts. Dietetic food sales are soaring.

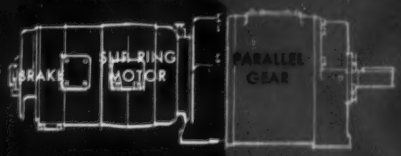
Cholesterol counts of everyday foods range from zero for green peas to 103 mg. for two slices of lean boiled ham, according to Midtown Clinical Laboratory, New York. Typical daily diet adds up to 599.7 mg.

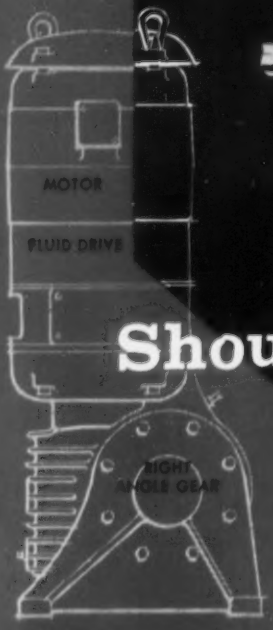
New dietary compound contains high concentration of essential fatty acids to reduce cholesterol in blood. It is an emulsion of safflower oil in water, made by Abbott Laboratories, to be used on physician's advice.



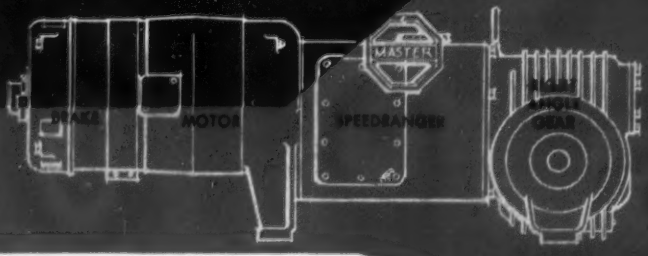
Your specialized drive requirements







Should meet their Master



Master Units Combine into Engineered, Customized Package Drives—Providing the Right Shaft Speed, the Right Construction Features, the Right Mounting. Why Put Up With Makeshift Assemblies?

Engineers and Manufacturers of

Electric Motors	**⅛ to 400 H.P.**
Gearmotors	**⅛ to 125 H.P.**
Variable Speed Drives	**⅛ to 30 H.P.**
Unibrake Motors	**⅛ to 150 H.P.**
Fluid Drive Motors	**½ to 15 H.P.**

Alternating current motors, direct current motors, generators . . . open, enclosed, explosion proof . . . with 5 types of gear reducers . . . with electric brakes . . . with mechanical or electronic variable speed units . . . with fluid drives . . . Master has them all and so can be completely impartial in helping to select the one best drive for you.

MASTER ELECTRIC MOTORS

THE MASTER ELECTRIC COMPANY, Dayton 1, Ohio

Assembly is simple

with bucket elevators LINK-BELT-built from head to boot

CHAINS, SPROCKETS, PULLEYS — a type and size to handle all kinds of material, satisfy any application requirement.

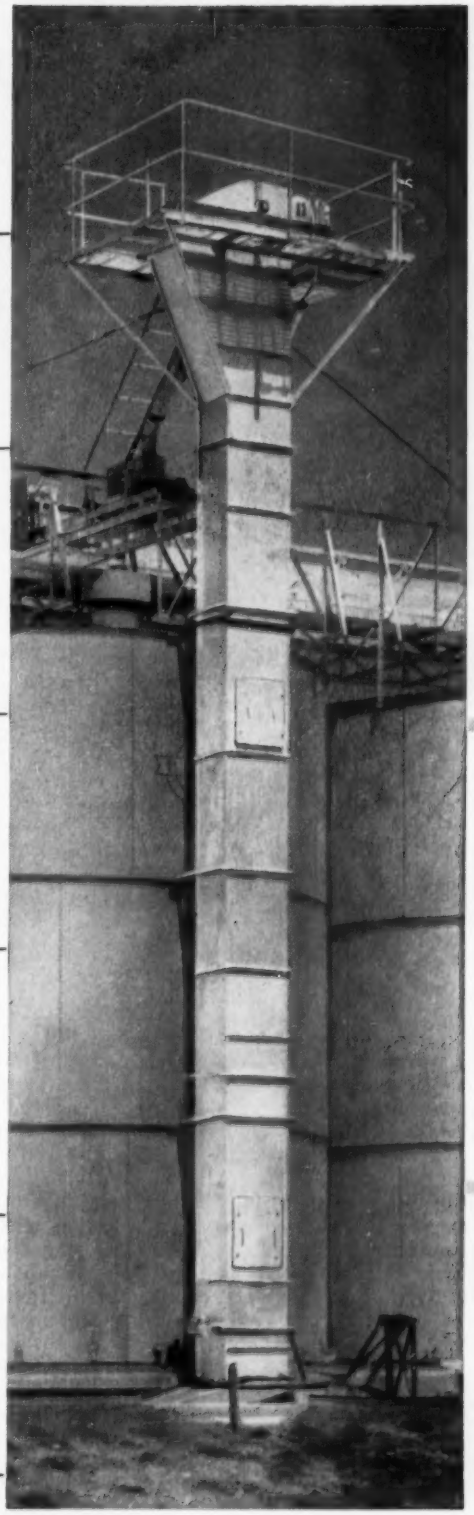
BEARINGS — We make all types — babbitted, bronze, ball and roller — to meet your specific service conditions.

CASINGS—are furnished weather- or dust-tight. They are self-supporting—where conditions warrant, lateral tie-in can be supplied.

ENCLOSED GEAR DRIVES — Gearmotors, Motogears, Worm Gear Drives — in sizes and ratios to meet any requirement.

BUCKETS—All types and sizes suitable for handling a variety of materials are available from stock.

TAKEUPS—A type suitable for adjusting elevator chain or belt to proper tension — babbitted, bronze, ball and roller bearing types.



All components are designed and manufactured for quick installation, smooth performance

HERE's a point worth considering when you review prices on bucket elevators. Installation costs have a big effect on the total outlay. And your best bet for holding field erection costs to a minimum is by relying on Link-Belt.

Reasons are: first, Link-Belt *manufactures all bucket elevator components*—your assurance that designs are related. Secondly, it's easy to select the proper bucket elevator to meet your specific requirements from Link-Belt's complete line. And third, with each Link-Belt bucket elevator you get built-in alignment.

In addition, Link-Belt will erect your elevator and accept full installation responsibility. For more details and assistance in selecting a suitable bucket elevator for your operation, call your nearby Link-Belt office today. 14,714

Designed for maximum elevating efficiency . . .

LIGHT, FRIABLE OR SLUGGISH MATERIALS, and those tending to stick to buckets are handled efficiently by positive discharge elevators.

FRAGILE MATERIAL—pellets, nuts, seeds, etc.—get gentle handling in internal discharge elevators offering high capacity. Double head shafts operate in fixed bearings.

LINK-BELT

BUCKET ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

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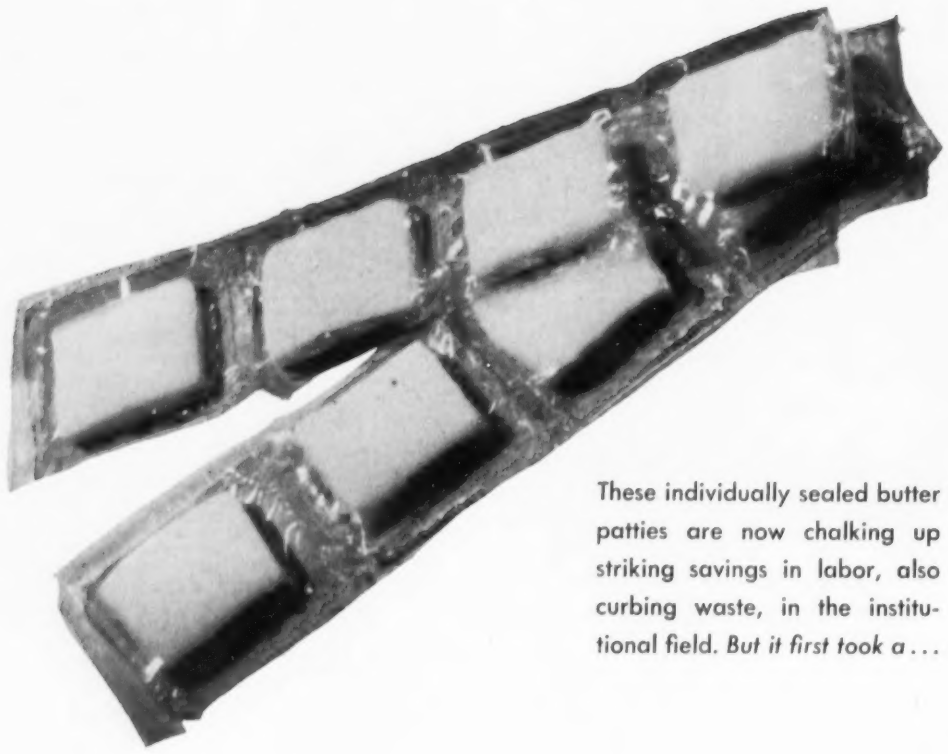
Creating The Package



These individually sealed butter patties are now chalking up striking savings in labor, also curbing waste, in the institutional field. *But it first took a . . .*

Radical New 'Hot-Cold'

SIMULTANEOUS application of both heat and refrigeration has solved a unique portion-pack problem—the sealing of individual butter patties in cellophane. And it may open the door to similar packaging of other heat-sensitive foods.

Primarily aimed, however, at the institutional butter market—an area that consumes about 410,000,000 lb. of butter annually—this radical technique and package is now in practical production at Beatrice Foods' Meadow Gold plant in Denver.

Biggest advantages of the individually wrapped chips, as seen by both Beatrice Foods and the machine developers (Butter-Pak Inc., Denver), are:

▶ **Dramatic curbing of institutional butter waste.** Being individually scaled, any unused butter patties can always be kept and re-served.

▶ **Sharp cuts in man-hours** required to slice or score commercial sheets of butter.

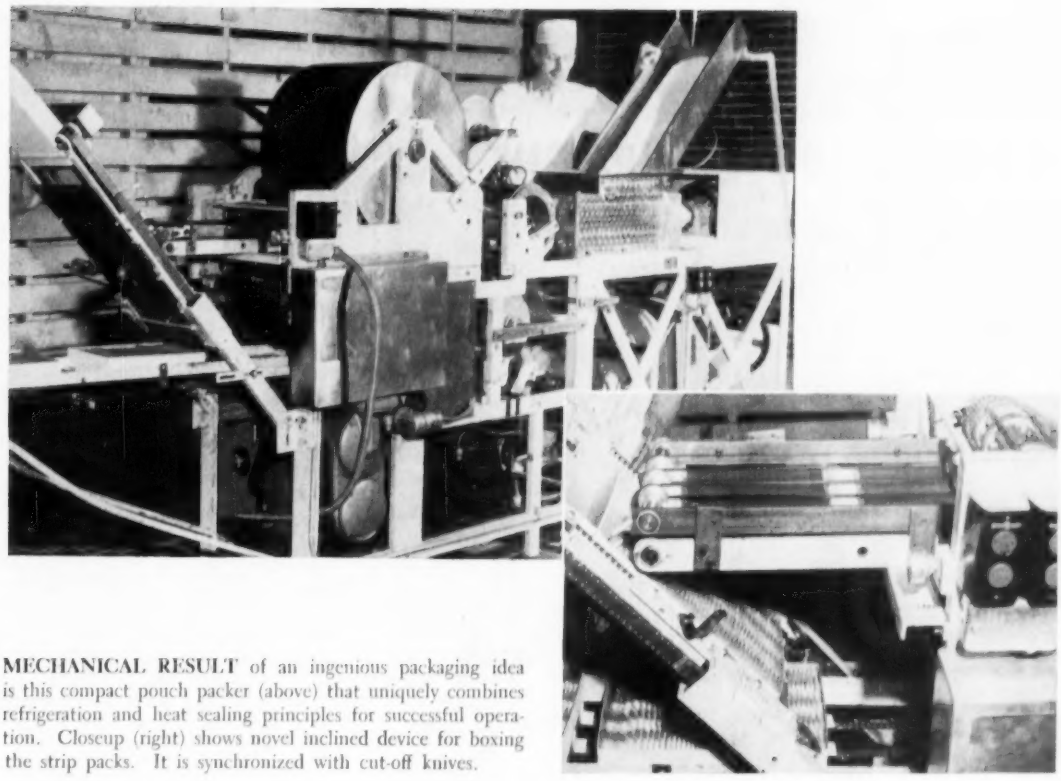
▶ **Sanitary protection for butter slices,** now subject to manhandling by institutional personnel.

In the first test of the new machine, carried out over a one-month period at Lowry Air Force Base near Denver, 18,000 lb. of butter was cellophane packaged at an overall cost saving of 25%.

This portion package got its inception when Harry A. Mead, a Denver inventor, noted the large amount of uneaten butter being unavoidably discarded in Denver restaurants. He concluded that this waste could be stopped by prepackaging.

Conceived as an objective was a machine that would produce the patties, seal them between two strips of cellophane, and be capable of adjusting to seasonal variations in the product. Inventor Mead aimed at a production rate of 600 to 1,000 lb. per hour, using bulk butter straight from the churn, or shaped in convenient blocks.

But the developers had to contend with far more than the usual number of 'bugs' in pursuit of these objectives. The basic difficulty stemmed from the fact that relatively high temperatures are needed in seal cellophane, yet the heat-perishable



MECHANICAL RESULT of an ingenious packaging idea is this compact pouch packer (above) that uniquely combines refrigeration and heat sealing principles for successful operation. Closeup (right) shows novel inclined device for boxing the strip packs. It is synchronized with cut-off knives.

Technique for Portion Packing

butter contents must emerge flat-sided square, and otherwise eye-appealing.

How the Unit Works

The resultant machine is a 4,000-lb. unit, 32-in. wide, 64-in. high, and 10-ft. long. It contains six separate motors, a refrigeration unit, heaters, and automatic temperature controls, thermostats, and recorders.

It takes eight blocks of creamery butter at a time, which slide into a stainless steel tank. Here, two stainless screws force the butter, under even, controlled pressure, through an extruder into a patty die—a 24-in. drum containing 60 impressions.

Even this step produced a problem. It was found that the butter adhered tightly to the screw spirals at low temperatures, thus clogging them.

This difficulty was solved by means of hollow augers, through which is circulated room temperature water that warms the screw blades.

On entering the extruder area, the butter presented yet another problem. Even under continuous auger pressure, the product contained air bubbles. To solve this undesirable phenomenon, the extruder was enclosed in an air-tight cylinder containing a slot in one side in which the extruder cylinder revolves.

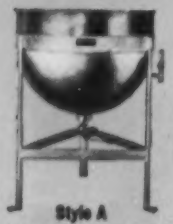
This latter unit is machined to very close tolerances, and has 60 patty-sized cut-outs around its circumference. The knife-edged slot in the air-tight cylinder neatly slices off each patty after it is pressed into the print drum (die).

A vacuum pump maintains 6-lb. suction in the extruder to further aid in air removal. This insures a bubble-less product—but also tends to offset the auger pressure. Therefore additional means were necessary to force the butter through the extruder into the corresponding sections of the patty drum.

Since use of air pressure for this purpose is 'out' due to the bubble hazard, an ingenious system comprising 60 metal 'feet' has been devised. These are square plates of stainless steel that fit neatly into the patty-sized apertures. Mounted on an

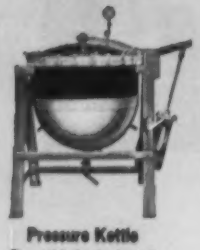
LEE
Corrosion-Resistant
PROCESSING EQUIPMENT

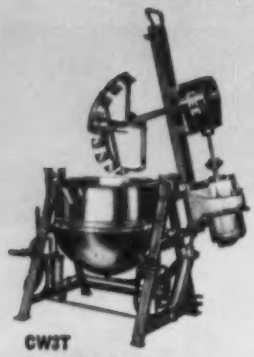
PRECISION BUILT OF STAINLESS STEEL
TO YOUR SPECIFIC REQUIREMENTS

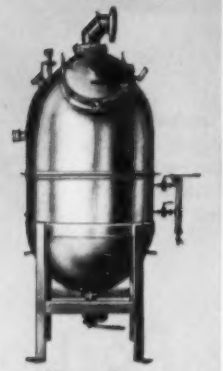

Style A
Two-thirds Jacketed
5 to 500 gal.

Style B
Full Jacketed
10 to 300 gal.

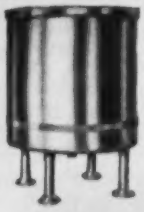
Style C
Two-thirds Jacketed
5 to 100 gal.


Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.


CW3T
Center-line Scraper
Agitator Kettle—80 to 300 gal.


Vacuum Pan
50 to 500 gal.

Style CW
Two-thirds Jacketed
80 to 300 gal.


Pulp Tank
500 to 2,000 gal.

Storage Tank
100 to 5,000 gal.

Quick Cooling Pan
50 to 200 gal.

LEE
Technical bulletins fully describing these processing units gladly sent on request.

METAL PRODUCTS CO., INC.
416 PINE STREET, PHILIPSBURG, PA.
Designers and Manufacturers of
Corrosion-Resistant Processing Equipment
for over 25 years.

off-set elliptical shaft in the center of the extruder, they mechanically squeeze the butter through the extruder into the die.

To compensate for changes in specific gravity—a seasonal characteristic of butter—auger speed and temperature are controlled by a variable-speed motor and gear reduction system, and an electronic rectifier.

At the packaging stage, a continuous, 8¼-in. strip of cellophane (MSB7, American Viscose Corp.) is tracked over the die. When the butter is forced into the die, it automatically presses the cellophane into each section, thus forming the bottom half of the package. Another strip of cellophane is rolled over the tops of the patties and sealed into place by a heat-sealing die.

This idea—simple in theory—was found difficult in practice. And its successful accomplishment broke the greatest problem in the pre-pack operation.

At first, the butter was too soft to force the cellophane into a neat, square packet. It would melt as the upper sheet of cellophane was sealed (at 235 to 250F.).

Refrigeration was the logical answer. But it was manifestly impossible to refrigerate the product in the auger or extruder sections, where increased viscosity would make forming a formidable task.

Nor could the die be refrigerated, since it turns continuously against the heat sealing drum.

Cold Film Solves Problem

The ingenious solution was to refrigerate the cellophane itself! As a result the first sheet now passes through a pair of cold plates operating at −22F. Thus, the sheet is cold enough to stiffen the butter instantly on contact, and to give it sufficient rigidity to insure a square packet.

Also, the butter remains cold enough to retain its shape under the momentary, high sealing temperature.

The completed sheets of patties are slit into four-packet strips, which are perforated for easy separation. Then, they pass to an automatic, inclined cartoning device (see photo), which can be set to box 43-50 strips in a 2¼-lb. carton.

Highly enthusiastic reports are coming in from institutional customers who have been experimenting with the pre-packaged product. Despite the current lofty market price—8c. above the standard for 1-lb. bricks—one Denver restaurant states that the new pack cut its butter cost 46% over a one-month period.

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Write for your regular SPOTLIGHT

S/P SPOTLIGHT

SCIENTIFIC PRODUCTS

NEW

17,000 r.p.m. high speed

Angle CENTRIFUGE *with full instrumentation*

An outstanding addition to the most complete line of Centrifuges in the industry!

- Instrumentation is complete—including autotransformer speed control, combination ammeter and electric tachometer, automatic timer, timer cutout switch, low voltage release and pilot light, steel guard bowl.
- Speeds up to 17,000 r.p.m., forces up to 34,390 XG.
- Exclusive remote control—instrument panel easily removed for connection to centrifuge by extension cord.
- Completely sealed 8 x 50 ml head. Adapters available for 10 and 15 ml tubes. Self-balancing controlled drive eliminates need for balancing head.
- Unit is 21 in. high, 14 in. wide, 17 in. deep. ½ H.P. motor. For 115 volts AC, 50-60 cycle single phase.

No. 59855—International Model HT Centrifuge. 8-place head for 50 ml tubes (but without tubes) $745.00

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For more data, circle this page number on card at back →

A significant advance in automatic high-speed carton filling and sealing

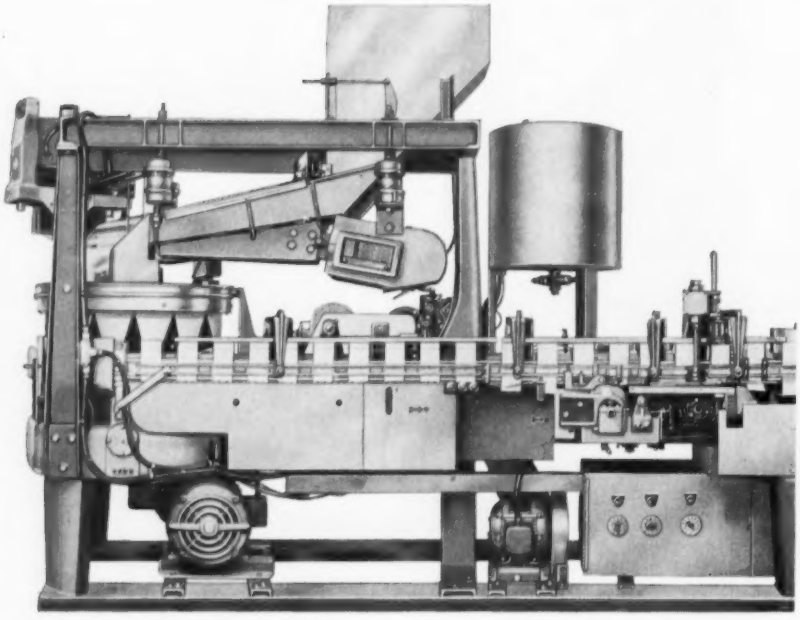
Only S & S Neverstop

Typical preprinted folding cartons automatically filled and sealed, with hot-melt adhesive, on Neverstop Model EH operating at a speed of 400 cartons per minute.

1 High speed carton filling and sealing... up to 400 per minute

Stokes & Smith has perfected and incorporated as standard features a series of important refinements which make possible higher filling and sealing speeds than ever before. First of these refinements is a new method of carton feeding utilizing suction to open and accurately position the cartons in the feed conveyor. Depending on the carton size, this new feed can operate at a rate up to 400 cartons per minute.

Selective, continuously running glue rolls, accurately spot adhesive on the carton flaps to assure positive bonding at high speed. To accurately control net fill at these high speeds Stokes & Smith has devised an entirely new electronic filling head to maintain the 400 per minute rate offered by the other refinements.



For complete details of these new developments, write for your copy of Neverstop Bulletin P-808.

fmc
FOOD MACHINERY AND CHEMICAL CORPORATION

FMC PACKAGING MACHINERY DIVISION

Stokes and Smith Company

4914 SUMMERDALE AVE.
PHILADELPHIA 24, PA.

← For more data, circle this page number on card at back

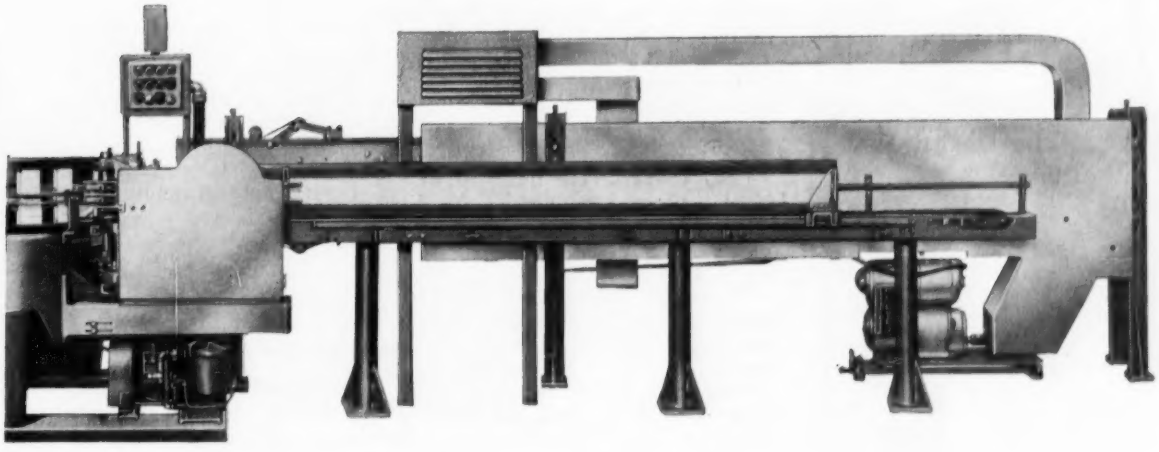
can give you...

2 Electronically controlled filling accuracy

This radically different filling method is designed for high speed filling which is accurate even when product density varies. The new head controls by electronic feed-back the rate of product flow into cartons to assure uniform net weight fill. It consists of a vibrating chute from which the product is continuously discharged on to a slanted check-weight scale pan and then into the cartons. The rate of flow is pre-set to deliver required net fill at the desired speed. Any deviation from this pre-set rate of flow is detected by the scale and relayed to the electronic monitor which automatically corrects the rate of flow by adjusting the amplitude of vibration in the chute.

3 With either hot melt or cold glue

For the first time, two basically different types of sealing are offered to assure positive bonding of a wide variety of carton stocks. In addition to cold glue, Stokes & Smith now offers models equipped for hot melt (thermoplastic) adhesive sealing . . . perfected and field tested for Neverstop in cooperation with adhesive producers and carton suppliers. With suitable cartons, hot melt opens up excellent possibilities for producing carton seals made sift-tight and "moisture-proof" without liners or overwraps. Substantial savings can thus be realized in the packaging of cereals, soap powders, spices, dessert powders and many other free flowing products where such sealing properties are desired.



6 models

To meet your packaging requirements at lowest cost, Neverstop is available in six models with a wide range of options as to carton size, speed of fill, filling method and type of adhesive.

For more data, circle this page number on card at back →

NEW PACKAGES & PRODUCTS

Colorful Cans Spur Chicago Beer Sales

TEN DIFFERENT label scenes in full color add eye appeal to beer cans.

CAN CARRIER uses same scenes.

CONTINENTAL cartoon character adds interest, appeal, to premium beer can.

Five years of experimentation with full-color lithographed beer cans has resulted in two sparkling new packages for Peter Hand Brewery, Chicago:

- A 6-color fine-register lithographed can printed in 10 different label styles for the brewer's Meister Brau brand.
- A "continental-style" label for a premium beer.

The six-color wrap-around label, developed by the brewery and its advertising agency, features halftone illustrations of happy young couples in colorful seasonal scenes. Ten different scenes provide a variety of labels, and allow the retailer to take a seasonal approach to displays.

Matching Carriers

The cans are production geared to give a full assortment in each "6-pack". The carriers themselves are printed in four styles, utilizing the scenes from the cans. Both the carriers and cans, because of their unusual and attractive appearance, have spelled out a 40% sales increase for Peter Hand.

American Can Co. prints two sets of ten labels on a single sheet of tinplate. The 20 cans cut from the plate are automatically arranged in a sequence that varies the labels. They are shipped to the brewery in 48-can cases.

The Continental Touch.

Three years ago Peter Hand introduced a quality beer in a standard blue, white and gold lithographed can. Called Reserve, the beer was marketed in limited quantities. It was made from imported hops, brewed by European process, and aged longer than the Meister Brau brand.

Encouraged by the success of its 6-color can, Peter Hand had redesigned the Reserve label. It pictures a "continental-looking" cartoon character in ten different situations —yachting, polo, etc. The variety of label styles serves the same purpose as in the Meister Brau—with the same resulting increase in sales.

Circle 26A on Reader Service Card

New Institutional Line

The new 'Big Q" line of institutional products marketed by Quaker Oats Co., is specially formulated and packaged for its market.

The line consists of five cereals and five mixes—including Aunt Jemima Portion Packed Pancakes, and Quick Quaker Oats. Each mix requires only the addition of water. Size of the package allows tight control of cost and quality, as well as reducing the necessary preparation time.

Introduce 2 New Coffees

A processor and a supermarket chain have introduced two new coffee blends:

Grand Union Co. is now marketing its Early Morn instant coffee in 2- and 6-oz. jars. The new coffee is priced slightly lower than the store's Freshpak brand.

S & W Fine Foods has released a canned ground coffee under their label.

The coffee is a specially developed blend of quality Latin-American beans.

Develop Nylon-Lined Bottle

Plastic Container Div., Continental Can Co., has announced the development of a nylon-lined plastic bottle. The .001-.002 in. thick nylon is reported to eliminate product permeation in almost all instances.

The new lining can be supplied in all Boston round, cylinder and oval bottle shapes with minor limitations.

Circle 26B on Reader Service Card

Jewel has a reason...

Jewel's delicious frosting mix guarantees "money back with a smile." Behind that guarantee is a package that securely locks in delicate flavors, protects fluffy ingredients from moisture vapor, and keeps fine powders from sifting through seams . . . a package that really guarantees "*customer* back with a smile." It's *protected by Riegel* . . . a phrase that means:

Product protection always, plus flexible packaging materials that are

. . . tailored to run at high speed on automatic machines

. . . made to your own specifications, printed, waxed, coated, and laminated combinations of all types

. . . packaging materials that are made right, run right, and priced right

Hundreds of today's best-sellers benefit from Riegel's uniformly effective system of product protection. You can, too.
Write Riegel Paper Corporation, 260 Madison Avenue, New York 16.

Riegel

PROTECTIVE PACKAGING MATERIALS

Jewel Tea Company's new Fluffy White Frosting Mix is protected by Riegel's Pouchpak . . . pouch paper laminated to foil, then printed and poly-coated. Packaged at high speed on Bartelt equipment. *TM*

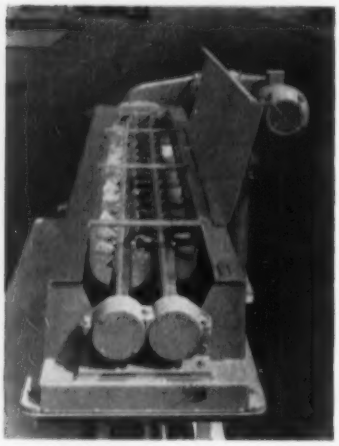
For more data, circle this page number on card at back →

More Production
•
Lower Mixing Costs

with

ANTHONY

CONTINUOUS MIXERS



Anthony Continuous Mixers offer you truly profitable mixing performance.

These continuous mixers handle a wide variety of materials such as flour, baking powder, cereal by-products, fondant, cake mixes and starch jelly. This listing by no means exhausts the many and varied items that can be mixed easily and profitably by Anthony Continuous Mixers.

When used in connection with a continuous weighing system, the ingredients are automatically delivered to the mixer, in the proper amounts. Capacities of standard mixers range from a few hundred pounds per hour to as much as one hundred tons per hour.

Special mixers can be engineered to fit your individual requirements.

Write or phone for more complete information to:

WILLIAM A. ANTHONY ENGINEERING COMPANY

6886 Pearl Road, Cleveland 30, Ohio

Victory 2-1300

N. Y. Representative: Edwin J. Jud, 520 Fifth Ave. New York 36, New York, MUrray Hill 2-5844

ENGINEERS and DESIGNERS . . . Continuous Mechanical Mixing Machinery • Special Machinery • Constant Volume Feeders • Conveying Equipment • And Continuous Weighing Systems

Packages & Products

New Polyethylene Sheeting

Full production of an adaptable new polyethylene has been announced by the film's developers, National Plastic Products Co., Odenton, Md.

Called Wynene Linear Polyethylene, the material boasts a high molecular weight. Its rigidity after molding, heat and cold resistance, and its sheet form, make it a natural for vacuum forming.

Non-toxic formulations of the material have been reported approved by the FDA.

The polyethylene sheeting is available in a wide range of colors.

Circle 28B on Reader Service Card

Grower's Produce Package

Straight from grower to consumer—that's the short route traveled by fruit and vegetables being packed in Marathon Corp.'s new Sunny Pak cartons.

Holding nine tomatoes (above) the carton is used by Ken W. Baird Co., San Ysidro, Calif. Construction features permit retail stacking without product damage.

Package weight is carried on corners, not contents, thanks to a recessed bottom.

Also using the carton are Newcastle Fruit Growers Assn., and Bianco Packing Co., both of Calif.

Circle 28C on Reader Service Card

SUCCESSFUL MARKETING of quick frozen ravioli in this aluminum foil tray with tear-tape lid has encouraged Damiano Ravioli Co. to increase its frozen line from seven to eighteen. The container is patented by Reynolds Metals Co.

Circle 28D on Reader Service Card

50% Bigger Margarine

Thousands of tiny air bubbles whipped into a new Kraft margarine retailed in the Southwest, Midwest and metropolitan New York make it 50% bigger than standard margarine bars.

The "airiness" also means easier spreading, quicker flavor release. The consumer also feels that he is getting more for his money since he gets six bars instead of the conventional four. There is a slight increase in price, however.

Label for the product is Kraft Miracle Margarine.

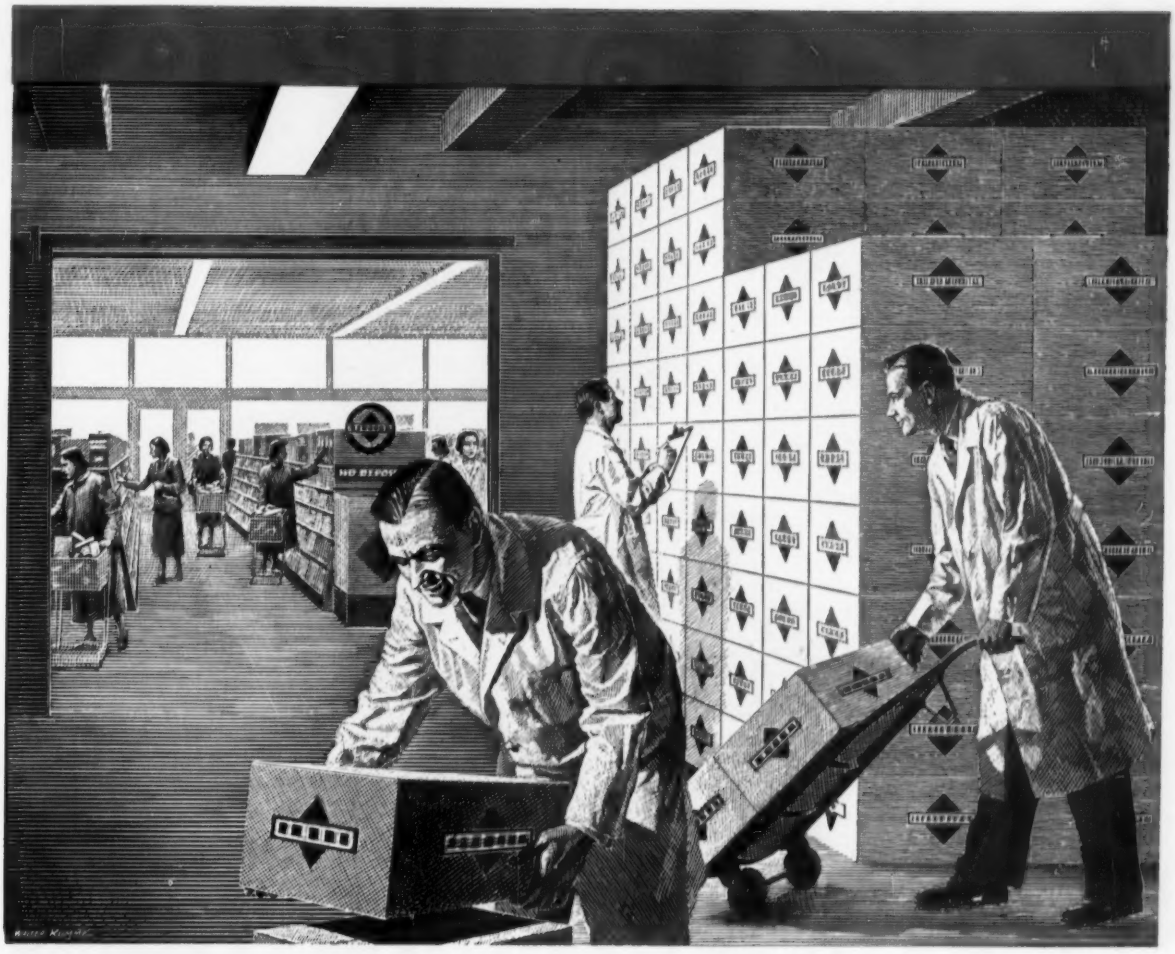
Processor Patents Pack

A patent on its Divider-Pak—two standard cans banded atop one annother with a paper tape—has been obtained by Chun King Sales, Duluth, Minn.

Separate packaging of the processor's chow mein and chow mein sauce has simplified consumer preparation of the two products since each requires a different amount of time to prepare.

Foil Laminate Overwrap Seals on Both Sides

Now available is a heat-sealing foil-laminate overwrap that seals on both sides. Called Foilwrap 2822,



WIN IN THE BATTLE OF BRANDS

There are more than 150,000 brand names registered in the United States—competing for the customer's attention.

In this "battle of brands" brightly printed Gaylord Boxes are a vital link in the chain of visual impressions that pays off in sales.

This is true because Gaylord excels in printing. Gaylord has the specialized experience and equipment to make quality boxes do their selling best—with your brand name accurately expressed in eye-catching colors.

Put Gaylord Boxes on your selling team. Call your nearby Gaylord office.

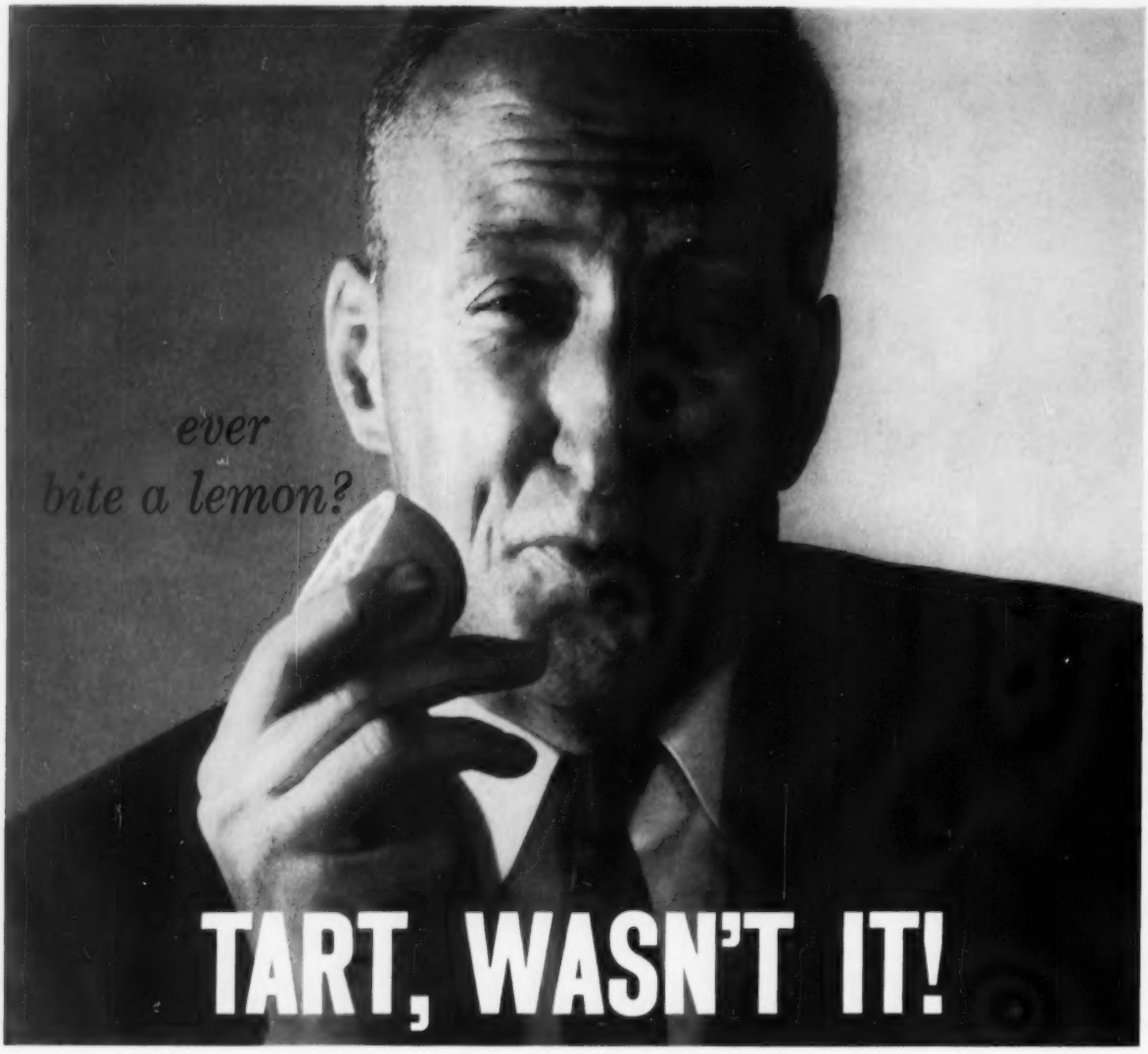
Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

For more data, circle this page number on card at back →



Tartness is what makes really good lemon pie filling. Like the kind made by Brechet & Richter Co. of Minneapolis, makers of top-quality fillings for the baking industry since 1909. Last year they decided to add even more tangy richness to their lemon filling. It made the filling more popular then ever. But—they created for themselves a real problem: the steel containers they were using couldn't stand up under the increased lemon tartness.

Inland Steel Container Company came to the rescue with a special food lining that is highly resistant to this increased tartness. The problem was solved. Today, Brechet & Richter's Inland "protection-eered"* steel pails carry their improved pie filling perfectly.

What's your problem? Safeguarding quality? Protection in transit? Inland Steel containers with a special protective lining may be the answer. Is your package delivering the quality you ship? Find out how Inland Steel containers put quality control into your package. Write Bob Boecher, Department 338G.

**the right container, with the right lining for your product.*

INLAND STEEL CONTAINER COMPANY Division of Inland Steel Company · 6532 South Menard Avenue · Chicago 38, Illinois · Plants: Chicago · Jersey City · New Orleans · Cleveland and Greenville, Ohio. *Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.*

the material was developed by Rap-in-Wax Paper Co., Minneapolis.

Made of .00035 aluminum foil on 25 lb. sulfite board the material stays flexible under a wide range of temperatures. Both sides have a corrosion-resistant thermoplastic coating.

Offering a tight seal, the overwrap is also reported to require less heat than conventional heat-sealed wrappers.

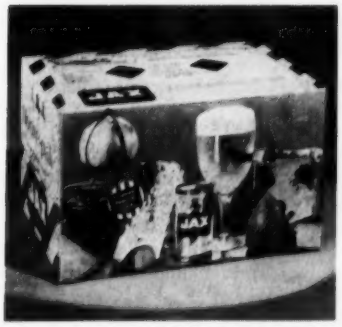
Circle 28A on Reader Service Card

Frozen Nuts Marketed

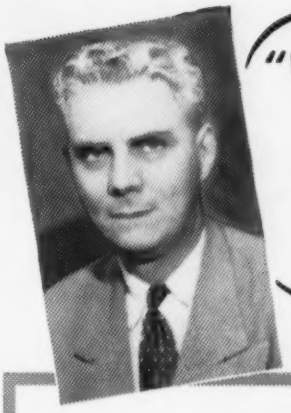
A year-long retail season for pecans is now possible with the introduction of Southwestern Nut Co.'s frozen 7-oz. package of shelled fancy pecans.

During the regular pecan season, retailers can display and store the nuts without refrigeration. After the crop has been harvested, the nuts can be frozen or refrigerated to ensure a year-round supply for the consumer.

Packaging is similar to that of standard frozens (chipboard box overwrapped with waxed paper).

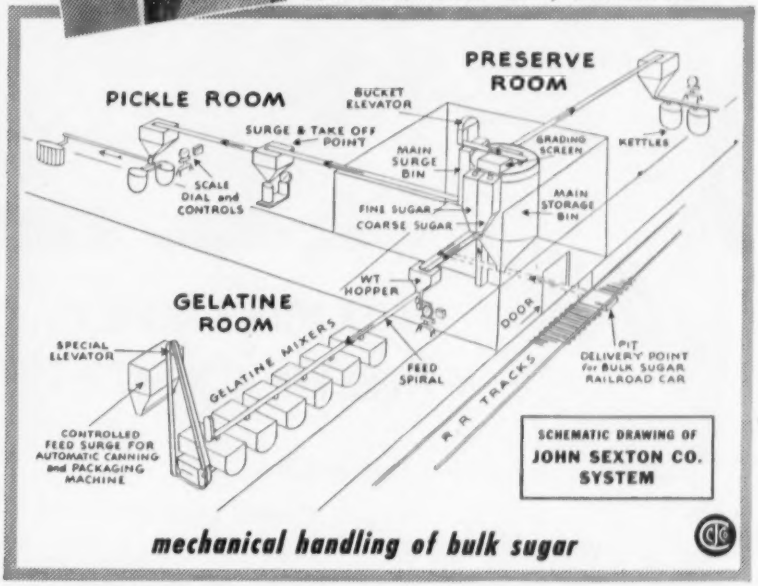


COLORFUL CAN CARRIER features the "Jax 'n Cheese" theme used by Jackson Brewing Co. to boost canned beer sales. The 5-color panel illustrates the brew's product placed among several types of cheese to spur appetite appeal. Point of sale tie-ins are to be made with cheese distributors.



"We chose J. C. CORRIGAN because of their
• TECHNICAL KNOW-HOW
• GOOD REPUTATION and EXPERIENCE . . ."

THOMAS WEBB SEXTON, *Assistant to the President*
JOHN SEXTON & CO. — Quality Foods Since 1883



mechanical handling of bulk sugar

TWO SUGAR SYSTEM "FIRSTS" in Sexton Plant. (1) Sugar grading screen (2) Sugar conveyed farther from storage area than in any similar food processing plant, plus recirculating.

An automatic, mechanical sugar handling system which is unique in two major respects is helping John Sexton & Co. of Chicago cut costs at their ultra-modern food processing plant in Indianapolis, Ind.

This system, designed, fabricated and installed by J. C. Corrigan Co., has two "firsts". It permits the grain size of the sugar to be automatically separated at the plant rather than at the refinery. Next, the sugar travels by conveyor system farther from the storage area than in any other similar food processing plant.

Savings? By handling sugar in bulk instead of bag, Mr. Sexton reports savings are equal to 35 cents per bag and might reach 50 cents, plus other important production advantages.

If your Company has a sugar handling problem, we invite your inquiry. List of our sugar system customers on request.

J. C. Corrigan Co., Inc.

CONVEYOR SYSTEMS SINCE 1925

Main Office-Plant
41 Norwood Street, Boston 22, Mass.

Sales Offices
NEW YORK CITY
Graybar Building
LExington 2-9272
SYRACUSE, N. Y.
HOward 9-4208
WEST HAVEN, CONN.
WEst 3-5417
RUTHERFORD, N. J.
GEneva 8-2141

For more data, circle this page number on card at back →

NEW

METER WITH A MEMORY...

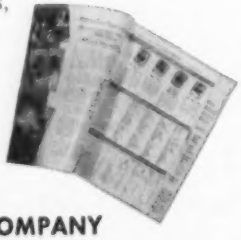
NEPTUNE REPEATING AUTO-STOP

Set it once... delivers same quantity of liquid batch after batch

You batch faster, free operator's time for other duties, and prevent setting errors with this *repeating* Auto-Stop meter. Set the quantity required by the formula just once, simply by pressing buttons. Then open the valve and the meter does the rest. It shuts off automatically at the exact amount. The meter "remembers"... delivers the same amount each time the valve is opened until reset for a different quantity.

Neptune meters end spoiled batches, overfilling, spillage and slow weighing. No more buckets or gauge sticks. Meters are safer, too. Hazardous liquids stay inside the pipe.

You can now meter hundreds of liquids... hot and cold water, syrups, oils, solvents, soap solutions and many chemicals. Auto-Stop meter capacities 5 to 300 gpm. Other Neptune features include ticket-printing registers and electrical Auto-Switch (shown above) to control pumps, valves or signals. Neptune Meters with simple counters or dials also available from ⅝ to 6 in. Ask for free technical metering Bulletin 566-OF .



neptune liquid METERS

NEPTUNE METER COMPANY

19 West 50th Street, New York 20, N. Y.

Branches in ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER • LOS ANGELES • LOUISVILLE • No. KANSAS CITY, Mo. • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO (Millbrae) • IN CANADA: TORONTO 14, ONT.

Packages & Products

THE "MAKINGS" FOR BEEF STEW are contained in this novel packaging idea suggested to meat packers or retailers who do their own packaging. Included with the meat cubes and cut vegetables is a sprig of parsley for color. The suggestion is by Olin Mathieson Chemical Corp., who can supply the cellophane overwrap.

Circle 32A on Reader Service Card

New Institutional Label

General Mills' institutional baking mix line is due for a major packaging change. A bright and modern grey and red carton is to replace the conventional paper bag.

An easy opening feature plus recipes and baking instructions on side panels offer added convenience to the users.

2 Polyethylene Coatings

A varnish coating that provides added protection and enhances the appearance of polyethylene con-

We're ready to take the wraps off...

a high capacity, high efficiency continuous solids discharge centrifuge

for dewatering and solids classification

and we'll prove it on your product...

The NEW SHARPLES SERIES P-3000 Super-D-Canter

May we make arrangements for a run on your material in the Sharples Testing Laboratories . . . ?

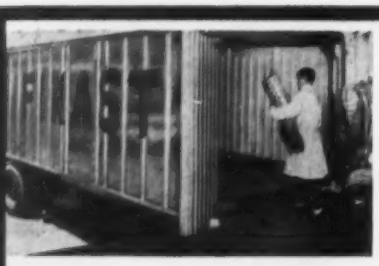
SHARPLES

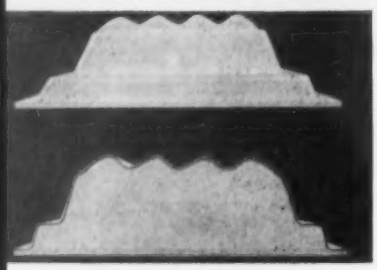
THE SHARPLES CORPORATION

2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA

NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • NEW ORLEANS
SEATTLE • LOS ANGELES • SAN FRANCISCO • HOUSTON • ST. LOUIS • ATLANTA

Associated Companies and Representatives Throughout the World





Typical cross section of Lami-Plast refrigerator door. The door pan is vacuum formed of thermoplastic, the door facing is of fiber glass reinforced polyester Lamicor. Insulation is closed cell non-moisture absorbing chemical foam. Note that foam insulation completely fills the void between door facing and pan giving uniform insulation and greater impact resistance to the door pan.

STRICK PLASTICS
INTRODUCES LAMI-PLAST
The first All Plastic Refrigerator Door

- Lightweight
- Longer Service Life Reduces Cost
- Resists Corrosion, Rust, Rot and Warping
- Maintains constant K-factor for life of door

Now for the first time the Lami-Plast refrigerator door overcomes all the basic disadvantages of conventional refrigerator doors. Its lighter weight eliminates the need for oversize hardware. The Lami-Plast door is dimensionally stable under all extremes of temperature, will not warp even in the presence of extreme dampness. The all plastic construction eliminates wood and wood to metal joints which are sources of heat transfer, giving uniform insulation over the whole door area. The Lami-Plast door will not rot, rust or corrode and the smooth plastic skin will not mark meat on contact and is easily cleaned.

Low Initial Cost Plus
Long Service Life Reflect Savings

For complete information, prices and delivery of Lami-Plast doors for your specific application write–

STRICK PLASTICS
PERKASIE, PENNA.

Basic Material Producers of Plastics and Laminates
Custom Vacuum Forming—Specialists on Extra Large Forms
Product Engineering and Development in Plastics and Laminates
Composite Structures and Honeycomb Panels

Packages & Products

tainers is now available from Bradley Container Corp.

Called Hi-Gloss, the coating imparts a high sheen to polyethylene and sharpens label colors. It also eliminates static and prevents scuffing.

A second coating called Barrier Gloss is reported to give polyethylene a glass-like clarity. It reduces permeation of essential oils and cuts oxygen passage through the plastic. Screening agents can be added to coatings during fabrication.

Circle 32B on Reader Service Card

Engineered For Re-use

C. H. Musselman Co., Biglerville, Pa., has adopted a new wide-mouth icebox bottle for its apple cider vinegar. Offering the consumer a high re-use value, the bottle is specifically engineered for its "second contents."

Its square sides permit easy refrigerator storage. The word "water" is blown into one side. A graduated scale on the side aids in mixing juice concentrates. The wide mouth is designed to hold an inverted 6-oz. concentrated juice can.

The quart icebox bottle is manufactured by Owens-Illinois.

Circle 34A on Reader Service Card

New Product Shorts

Three additions to the well-known Campbell Soup Company line of condensed soups are minestrone, chicken vegetable, and turkey noodle.

Consumer Package of super sharp cheese —a foil-wrapped 12-oz. chunk—**has been** announced by J. S. Hoffman Co., Chicago

B.F.Goodrich report:

Cannery cuts glove costs in half by switching to B.F.Goodrich brand

IN the 5-year period since standardizing 100 per cent on B.F.Goodrich rubber gloves, a California cannery reports that glove costs have been cut nearly one half. Reason is that these gloves stand hard use, last longer.

B.F.Goodrich canner's gloves are more than just strong—they are uniformly strong, even between the fingers where many gloves are weak. Use of a special rubber compound provides maximum resistance against the conditions encountered in food processing plants.

These gloves are ideal for use where finger dexterity is required. They are thin, light, soft and flexible. Palms and fingers have a molded-in crinkle finish, which gives sure, positive grip even when wet, slippery fruits and vegetables are being handled.

Workers like B.F.Goodrich canner's gloves because they are more comfortable in feel and fit. A special process makes them easy to put on and take off. They have curved fingers for added comfort and work ease; are made with an extra fullness at the back for free action. Long gauntlet can be worn straight or cuffed.

B.F.Goodrich Style 5293 canner's gloves are made in an attractive russet color, in sizes 7, 7½, 8, 8½, 9, and 10. They are sold by B.F.Goodrich distributors everywhere. Arrange to try these longer-lasting rubber gloves in your plant. See if they don't cut your glove costs. *B.F.Goodrich Industrial Products Co., Dept. M-191, Akron 18, O.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Libby's
TOMATO JUICE
Stokely's
Finest
SAUER KRAU
GREEN
GIANT
GREAT BIG
TENDER
SWEET PEAS
ARMOUR
STAR
READY TO EAT
PORK AND HAM MEAT
Treet
Carnation
EVAPORATED
MILK

Leading brands of canned goods are protected by Mead container board

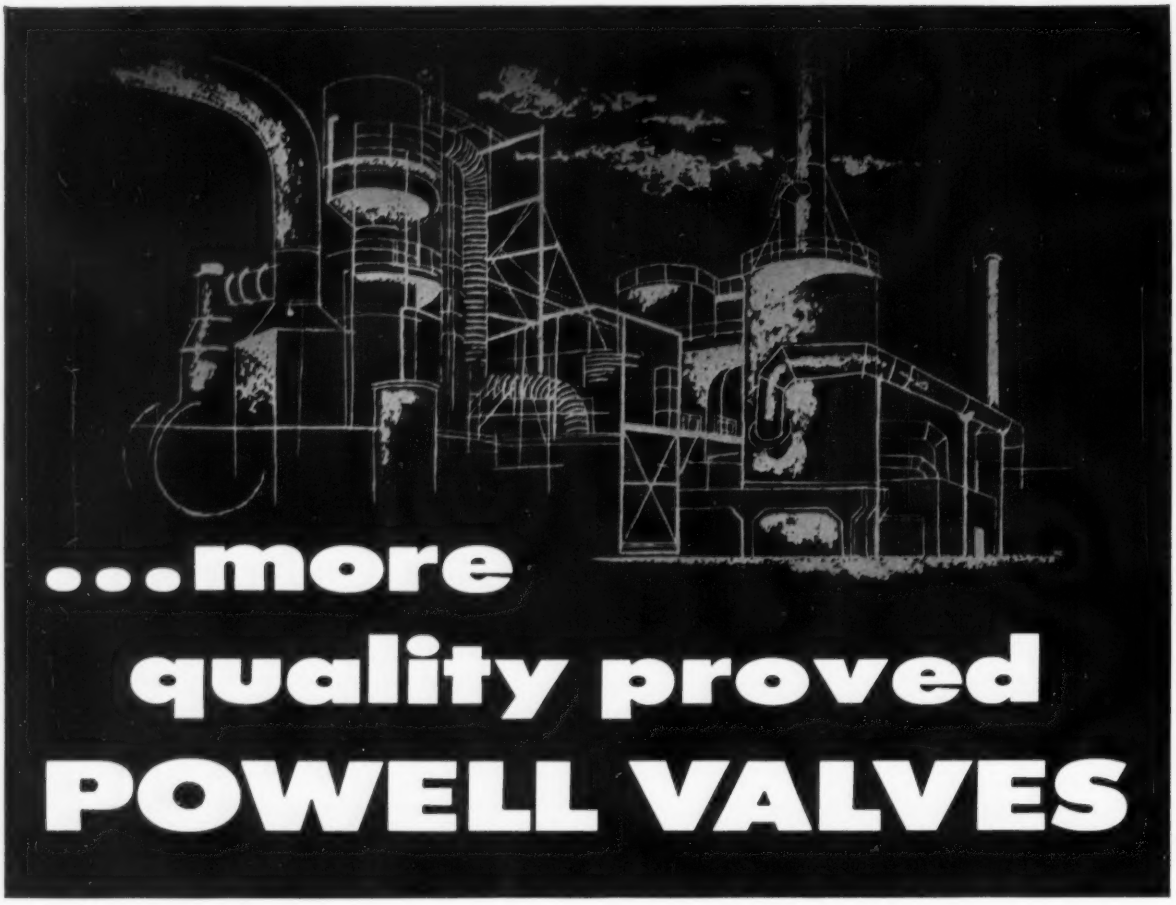
First-class products must arrive at their destination in first-class condition. Leading packers of quality food products make sure of this by specifying shipping containers made of top-notch container board such as that manufactured by The Mead Corporation.

In its 111 years, Mead has grown into one of the largest producers of container board in the country. With its vast timberlands, its seven large board mills in Tennessee, Virginia, North Carolina and Georgia, and its elaborate research facilities, Mead today supplies virgin kraft liners and Chestnut semi-chem corrugating medium for a good share of the millions of shipping containers used in America each year.

Food, appliances, household items, packaged goods, metal parts: these are just a few of the products protected by Mead container board.

THE MEAD CORPORATION Sales Offices: Mead Board Sales, Inc.
Cincinnati • Chicago • Detroit • Boston • Newark, N. J. • Lynchburg, Va.

MEAD
container board



...more quality proved POWELL VALVES

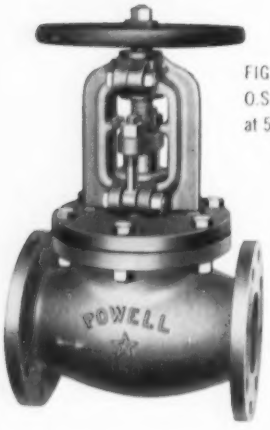
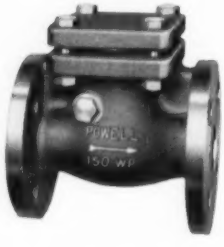


FIG. 2429—Large Size Stainless Steel O.S.&Y. Globe Valve for 150 Pounds W.P. at 500 F. or 230 W.P. at 100 F.

FIG. 1314A—1500-Pound Integral Bonnet Stainless Steel "Y" Valve.

FIG. 2453SG—Stainless Steel O.S.&Y. Gate Valve for 150 Pounds W.P.

FIG. 2342—Stainless Steel Bolted Cap Swing Check Valve for 150 Pounds W.P.



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Consult your Powell Valve distributor for all the facts about quality proved bronze, iron, steel and corrosion-resistant valves. For every flow problem . . . there is a Powell Valve to solve it.

THE WM. POWELL COMPANY, CINCINNATI 22, OHIO . . . 111th YEAR

Ole Sage Episode

Pushard frowned. "As company head, my responsibility is administrative—to delegate duties and require results!"

Is Worker Morale the *President's* Job?

IVAN C. MILLER

"Food Engineering"

LET'S GET THIS over fast!"

The speaker was P. J. Pushard, president of Y&G Specialty Foods Co. Exactly on time, he'd started this crash conference that aimed for a speedy cure of the company's worker difficulties—the mounting accidents, absenteeism, and grievances that had soured morale and sent plant output skidding.

Pushard addressed Ole: "At our last meeting, Sage, you outlined the causes of this trouble. Now if you'll just tell us the specific remedy I'll appoint someone to work with you for direct correction of the situation. This man I name will have full authority to act—and he'll be held responsible. Meanwhile, of course, I'll require regular reports to check the progress in improving our production. And that should be it!"

Ole remained grave. "Mr. Pushard," he said, "I'm afraid you've missed my whole point—or else haven't caught its import. As for drafting an adequate program, that's no particular problem. But what I must again emphasize is that any success will depend on you, Mr. Pushard, in your post of director of company policy.

"That is, it will depend on the extent to which you personally implement the program and convince every employee—workers and management alike—that you, yourself, are *actively* behind it."

Ole paused, expecting Pushard to blow off steam. Instead, the president merely said: "Go ahead, I'm interested—even if I'm not yet convinced."

"Personnel Manager Watson, here," explained Ole, nodding to Tom, "won't be able to sell your workers on the idea of their rallying against this problem merely by his telling them that you said to him that you are concerned. But you can win their support if you personally show them—prove to them—your concern."

Pushard frowned. "I still don't agree that such rank-and-file assignments are *my* job," he clipped. "As company head, *my* responsibility is *administrative*—to delegate duties and require results!"

Ole hesitated a moment, but then pressed on: "I'd like to digress here to emphasize a point. Earlier, I learned from Tom Watson that during the period when your company was negotiating your last union contract, you, Mr. Pushard, were present and untiringly active at every meeting."

"Of course," admitted the president. "But that's a horse of quite another color. Had the strike, which then threatened, been called, it would have crippled us seriously. Also, we'd have been greatly handicapped if we'd had to concede all of the union's demands. I didn't dare chance any slip-up in getting a reasonable settlement."

"That's right," volunteered Plant Manager Jerry Mastead. "If it hadn't been for Mr. Pushard's sticking by his guns in those meetings, we'd have had to take the strike or else cave in on concessions."

"Then I'm surer than ever," Ole resumed, "that Mr. Pushard's personal backing—I might better say his

"The ounce of prevention is consistent training—sold from the top down"

personalized backing—will be the No. 1 factor in assuring success for the program initiated to restore your production rate.

"And," continued Ole, "the time, the effort, and the leadership Mr. Pushard gives to this program is as thoroughly justified as was his prime role in that union bargaining. Furthermore . . ."

"Mr. Sage," interrupted Pushard, "I certainly can't see any basis for comparison—any justification, that is—for your elevating this . . . this *personnel* program . . . to the same high level as our vital union contract negotiations."

"Well," said Ole, in a calming tone, "my reason for implying the two may be equally important goes back to profit-or-loss fundamentals. The upswing you've had in accidents, absenteeism, and turnover at your plant represents a cost almost certainly in excess of the wage increases and price of fringes granted to your employees in their last union contract. And further," Ole elaborated, "when accidents and absences build up, employee morale disintegrates. And then output plummets."

"Looks like I have to be *all* things to *all* people," grumbled Pushard. "Well, if I must I must. So let's have the details."

Turning to Watson, Ole said: "From your experience, Tom, you know it's not possible to select and hire only the perfect applicants. And for that matter, certain circumstances can turn satisfactory workers into disturbing influences. At any rate, the careful screening of applicants is of major importance to keep admissions of the emotionally unsound to a minimum."

"In general," asked Y&G's General Superintendent Bill Pacer, "What's the formula for screening?"

"Well," replied Ole, "if an applicant has had severe mental or emotional difficulties, there'll likely be a clue to it in his medical and personal history. So study carefully every portion of each application for such indications. Also, always be certain to check thoroughly with former employers.

"Emotional weaknesses," went on Ole, "often become apparent while the applicant is undergoing his physical examination. So whoever conducts this checkup should be alert for any such evidence.

"Then, when the stability of an applicant actually is in doubt, turn him over to a psychologist for further testing. Or else be very vigilant in observing his reactions and adjustments during his trial period."

"Also," Ole warned, "the 'square peg in a round hole' is another angle. Wrongly placed, an otherwise quite acceptable worker may become a troublemaker. Hence, assigning the new employee to the right job becomes a paramount management responsibility."

Tom nodded. "That's why I insisted that our contract specify a 90-day employee trial period in which the worker can be transferred at the option of the immediate superior or else dismissed if preferable and justified."

"In addition," advised Ole, "each questionable newcomer should be checked on regularly through reports from his immediate superior—with a supplementary interview, where feasible, by a competent member of personnel. Also, where possible, I recommend that a psychologist determine how well the new worker has adjusted—as a final check before accepting him."

At this point Pushard cut in: "Yes, yes, the new employee is one thing. But you earlier intimated, Mr. Sage, that our work force is honeycombed with unstable employees. Well, how do we identify them? And then what do we do about them?"

"It's not difficult to spot them," assured Ole. "They're the ones who frequently have personal conflict with the foreman or fellow workers. They're often late or absent. And characteristically they pay little attention to safety rules. Finally, they're the ones who worry—about anything and everything.

Ole went on: "Tactful counseling of the difficult employee, is initially the best way out. Often this approach adds to the worker's sense of belonging and being important, as well as correcting misconceptions which, if not faced early may be magnified by time. And often such counseling is of double benefit—also helping the counselor to get a better perspective of things.

"However, prior to curative procedures there should be *preventive* measures. The ounce of prevention is consistent training—and this is the job for first-line supervisors. To prepare foremen for this responsibility requires that they, too, be trained. And this instruction will only be successful when sold from the top down and backed up all along the line."

Recognizing a probable future responsibility, Tom Watson asked: "Just what sort of training?"

"For one thing," pointed out Ole, "the factors that make workers antagonistic and troublesome should be gone over, with stress on how best they can adjust to their jobs. Included also should be such subjects as psychology of motivation and how emotions affect both mental and physical well-being—and hence work habits.

"The fundamentals behind undesirable worker attitudes aren't too difficult to understand and explain. A psychologist can readily outline courses of action. Then, too, when there's a nurse in attendance—part or full time—she can be trained to watch for symptoms of mental or emotional disturbances."

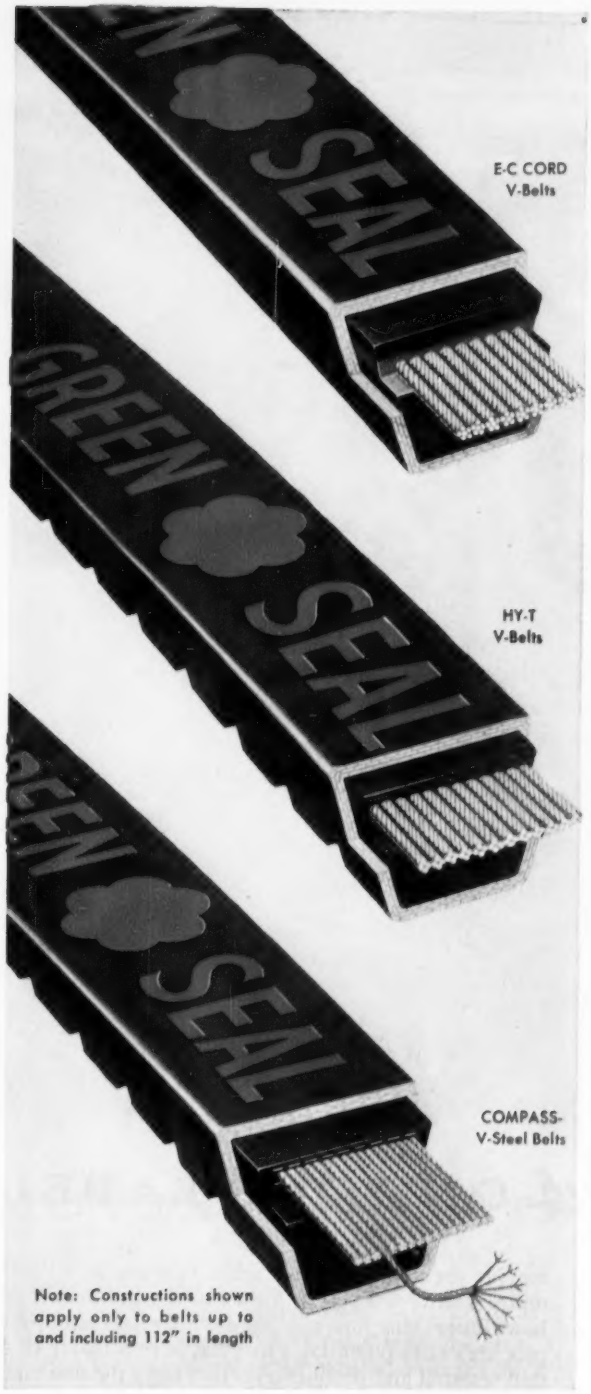
"Sage," broke in Pushard, "you mention nurses, doctors, psychologists, and training courses as though we were a billion-dollar corporation. Actually, we're *small*. With us, such things would be absolutely extravagant."

"But," replied Ole, "consider this: You're really dropping more than the cost of such services in lost production. Also, let's not overlook the problem and needs of operations of your firm's size. Most businesses are small, and especially in the food industry. A lot of them in this very area parallel you in size.

"Already, in quite a few localities, companies have teamed up to share the benefits and split the costs of doctors, nurses—and even psychologists. And in this respect, it seems to me that our industry has this advantage: There are a number of food plants in nearly every community. And where they band together in such a plan, the medical people participating will be working with the common problems of a homogeneous group—food-plant employees. Under such circumstances, you can expect good results at moderate cost."

Muttering something about "another pressing matter across town," Pushard abruptly was on his feet. But there was the suggestion of a grin on his face as he left his chair. "All right, then, Sage," he said. "I must get *personally* behind this thing. Double duty for me!"

Then at the door he turned: "And about this business of sharing medicos—you know, it's . . . well, it's a *challenge!*"



Why V-Belts with the Green Seal ?

The Green Seal is put on each Goodyear multiple V-Belt for *your* protection. For it's your sign of a belt with dimensional stability—something long sought but only recently achieved in a complete line of V-belts.

What does dimensional stability mean to you? It means belt length remains the same from factory to drive. The length you order is the length you get. Matched sets stay matched. And mismatching – the biggest problem in belting multiple drives – is now a thing of the past.

How was this dimensional stability achieved? Until recently, stable belt length was possible only with steel cable load carriers as developed by Goodyear. But now it is also accomplished with synthetic cord through the exclusive Triple-Tempered 3-T process that stabilizes length by careful tempering with Tension, Temperature and Time.

Triple-Tempering also gives you a stronger, more shock- and stretch-resistant belt. Add "balanced construction" – with each component of the belt designed to its job—and you have a smoother-, longer-running belt which means maximum, trouble-free horsepower hours at minimum cost.

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THE GREATEST NAME IN RUBBER

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A HEALTH *plus* ON YOUR LABEL

● Every meal she sets on her table must meet two basic requirements . . . it's like second nature to her: a meal must be *appetizing* and *health-providing*. With these goals in her subconscious, what happens in the store?

The grocery store is the proving ground of competition. *Hundreds of powerfully advertised brand names compete for her favor*, for her judgment of what will provide appetizing, health-providing meals. That's when your food product needs *a plus on the label*, a signal to her health-consciousness!

"Vitamin Enriched," "Vitamin Fortified." Those signals, those words can make a big difference today in moving *your product* to her table. Why not let a Pfizer representative tell you *in his words* the full details on how Pfizer vitamins can significantly increase your product's sales potential. Pfizer has been a major vitamin research and production center since the first vitamin was commercially produced.

Here are just 3 examples of food products that are increasing sales with Pfizer vitamins:

A health plus on the label of carbonated beverages says "Vitamin Fortified" *(and means sales)*. With Pfizer Vitamin C and Vitamins of the B Complex fortification costs just a fraction of a cent per bottle.

Pfizer experience can help you put the health

MOVES PRODUCTS TO HER TABLE

A health plus on the label of flour, macaroni and similar products says "ENRICHED" *(and means sales)*. New light-color Pfizer BI-CAP is now simplifying the problem of enriching white flour for many millers.

A health plus on the label of canned juices and concentrates says "Vitamin Fortified" *(and means sales)*. Fortification here will offset processing losses and seasonal variations in natural vitamins.

* * *

What's the most powerful *plus* you can offer the food shopper? It's those extra health words on your label. Let Pfizer help you put them there.

Quality Ingredients for the food industry for over a century

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plus on your label simply and economically

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Only Gas Atmosphere's new Nitrogen Generator has all the features you have asked for in a production generator. It comes as a COMPLETE PACKAGED UNIT ready to be set on stream with a minimum of make ready. EXCLUSIVE AUTOMATIC TURN-DOWN enables production coincident with demand, eliminating gas waste. SIMPLIFIED RATIO CONTROL assures uniform gas analysis always. SINGLE BURNER OPERATION means easier combustion control. This new generator develops HIGHEST PURITY NITROGEN and, where required, CO_2 can be obtained from the same unit simultaneously. Here is truly the nation's top nitrogen generator. Be sure you look into it before you buy.

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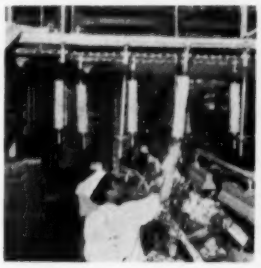
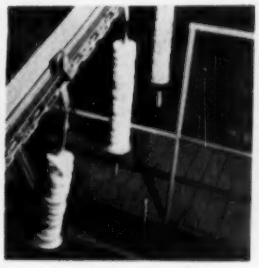
CUT OUT AND FILE

PRACTICAL IDEAS



Sticks are suspended



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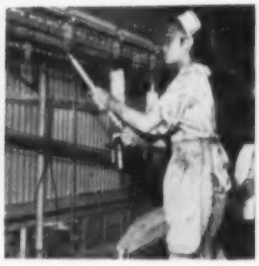


. . . and relayed

Halves Labor With Overhead Monorail Conveyor

A new product conveying system cut labor needs by 50% in our pineapple tidbit operation.

In our present setup, loaded sticks of pineapple rings (see photos) are removed from the packing table and hung on the variable-speed monorail conveyor by a tray boy.

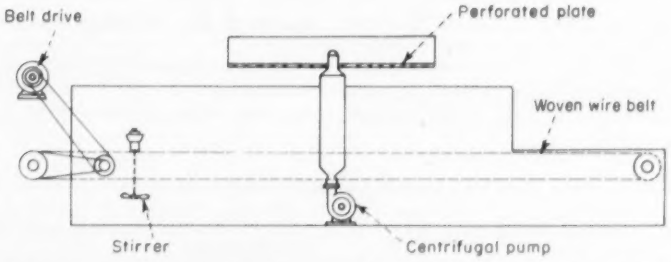
The sticks of slices are conveyed across the cannery to the tidbit-cutter feeder girl. She upends the sticks into the cutter. This unit then divides the slices into segments. Empty sticks are replaced on the conveyor.

Formerly, the operation proceeded as follows. Fruit was cored, trimmed, sliced, and then hand graded for quality. Individual slices were put in cans (fancy, choice, and standard) according to the grading standards.

Cans were conveyed to a hand unloading area. From here slices moved on a belt to the cutter. Before entering the unit, product had to be handled again to make sure it entered the cutter properly. All these operations, especially the emptying of the cans, had to be done with extreme care.

Now the triple handling is eliminated along with the extra care that went with it. Also, peak loads do not require increases in manpower.

The conveyor services twelve packing tables and up to three tidbit cutters.—*W. D. New, Cannery Engineer, Hawaiian Canneries Co., Ltd., Kapaa, Kauai, Hawaii.*



Water Spray Chills Produce

By chilling asparagus, green beans, and broccoli fresh from the field (temperature about 60F.) to 38F. our hydrocooler unit (see photo) has upped quality and enabled us to store produce up to 48 hr. before processing. This permits us to harvest at peak quality and yet have some control over production rate.

Loading, up till now, has been by hand, but we plan to install a mechanical fork-truck fed lub box dumper, soon. After having been dumped on a woven wire belt (Cambridge Wire Cloth Co.) product is carried (at 800 bu./hr.) through a cooling tunnel (see sketch) where it is sprayed with ice-chilled water (about 35F.).

Ice blocks are loaded at the side. A motor driven stirrer insures that the water passes over the ice for proper cooling.

Spraying is accomplished by allowing water, lifted by a centrifugal pump, to drain through the sieve-like ceiling. Water passes over product, drains through the belt and returns to the tank for recirculation.—*Webster McAllen, Plant Superintendent, Coastal Foods Co., Cambridge, Md.*

Paint Roller Coats Pies

When washing the edges of pies to make top crusts stick and prevent fillings from boiling over, it was customary to use a 4-in. paint brush at Grable's Bakery, Miami, Fla.

Since light aluminum pie pans are now in use, this operation of circling the edge often sent the pans into a spin.

Now a 9-in. paint roller is used. It is moved across the pie and the pan remains in position.—*W. J Holmes, Miami, Fla.*

What's the flavor of your food products? That's a hard question since flavor changes not only with the product, but also with each step in processing.

With this thought in mind, our research department conducts continuous, exacting tests of Victor Belting under actual operating conditions. Result: your guarantee of easily – yet completely – cleaned belting with no chance of residual food contamination or imparting of "belt-taste." That's why – with complete confidence – we recommend for *your* food handling:

VICTOR SUPRENE special-woven cotton duck belting thoroughly impregnated with an exclusive Neoprene compound. Water-proof, highly resistant to grease and most food chemicals, smooth-surfaced, and easily cleaned.

VICTOR 475 highest quality, solid-woven cotton belting impregnated and coated with a special Neoprene compound. Developed for use where laboratory cleanliness is a *must*. Washable with hot water or steam. Resists rancidity and deterioration.

A COMPLETE LINE Including: • Hycar Belting • Neoprene Belting • Balata Belting • Solid-Woven Belting – Untreated, impregnated, coated – many widths and plies • Canvas Stitched Belting • Belting Specialties

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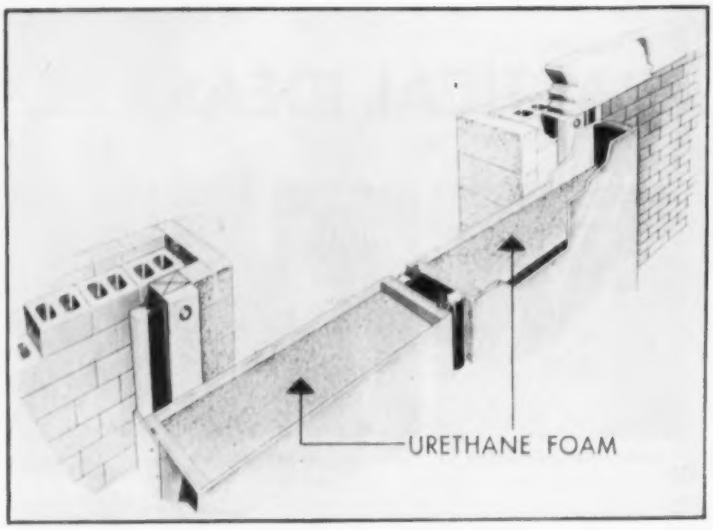
Practical Ideas



Foam-Filled Freezer Doors

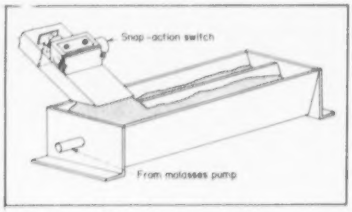
This new simplified construction for refrigerator doors (see sketch) is stated to offer three advantages:

1. It's easily made.
2. It's stronger than conventional units.
3. Weight is cut to less than half that of ordinary doors. This facilitates operation of automatic opening and closing mechanisms. The resulting faster travel when operating doors pays off in shorter periods that the doors are open and less refrigeration loss.

Making a unit involves weighing prepared ingredients into a pail, adding a catalyst, and mixing a few minutes with a hand-held power mixer. The pail's contents are poured through slots in a metal door frame.

Foaming begins immediately and the urethane expands to fill the doors within 10 min. Overnight the foam cures enough so that doors can be sealed and hardware installed.

The material weighs about 2 lb per cu. ft. and has a K factor around 0.27—*"Elastomers Notebook," publication of E. I. du Pont de Nemours and Co., Wilmington, Del.*



Control for Mixing Feed

Before we installed a snap-action Microswitch on the feed chute to our feed mixer, the flow of molasses

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Send one of your ideas to FOOD ENGINEERING.

Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in ten.

Also $5 to $15 (sometimes even more) is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

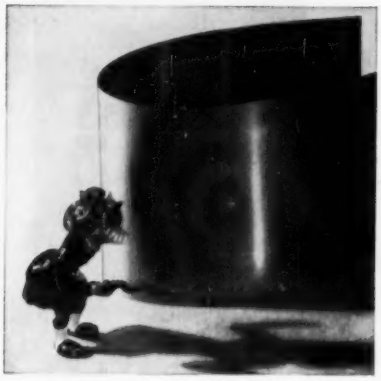
We'll do the finished writing and drawing for you.

Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y. —The Editors.

JULY PRACTICAL IDEA WINNER was "Warns When Tank Is Low," submitted by G. F. Suchy, Chief Engineer, The Borden Co., Waukesha, Wis. (Winners are chosen by Readex, a foremost outside survey agency that regularly polls many scores of FE readers throughout the country.)

No matter which *FINISH* you like—you can buy it in

MicroRold® QUALITY STAINLESS STEEL



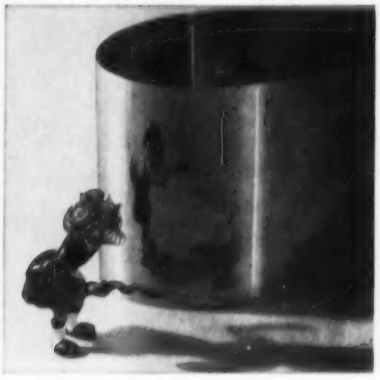
2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.

No. 3—This surface is made by grinding with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.

No. 4—A finer finish than No. 3 made by grinding with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.

No. 7—Good reflectivity and brilliance made by polishing with a No. 400 abrasive. This semi-mirror finish must be protected during fabrication by adhesive paper or strippable plastics lest the finish be marred beyond repair.



BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are available in types 201, 202, 301, 302, 304 and 430 except Bright which is type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

Since Nos. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Dept.

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The Three Hazel-Atlas "Imps" Say—

chicks, oodles of noodles, and minced meats —bees, beans, and slaw treats

. . . sell better in our glass packages!

Whatever you pack, it will get more sales *impact* and produce more *impulse* sales in beautiful H-A packages, because:

1. Your foods' appetizing color and shape are salesmen with *silver tongues*, when you let them speak for themselves in a beautiful H-A container. Fruits, vegetables, meat, preserves—all products keep their fresh personality when their natural beauty is displayed in a crystal-clear H-A jar.

2. You give your product two selling lives when you pack in an H-A decorated tumbler—*first* selling your food with sparkling design and color from the self-service shelf, *continuing* to sell in the consumer's home as an often-seen re-use container.

Rigid quality-controls keep H-A containers uniform in size, shape, clarity and color. You are sure of fast, dependable delivery service during sales peaks and emergencies, served by H-A's nationwide network of glass plants and warehouses. For details, ask your nearest H-A representative.

...glamour in glass!

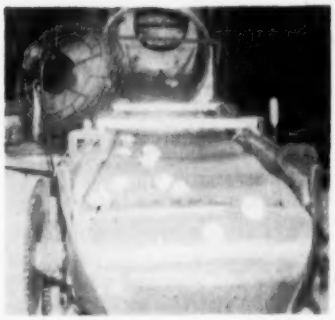
HAZEL-ATLAS GLASS

Division of CONTINENTAL CAN COMPANY
WHEELING, WEST VIRGINIA

often continued after the flow of feed had stopped.

This caused considerable loss of time in cleaning the mixer before operations could be continued.

The snap-action switch on the gravity feed conveyor assures that both feed and molasses are simultaneously supplied to the mixing chamber. The switch is wired in series with the molasses pump motor so that the flow of feed pushes against a plate (sketch) to hold the switch in the operating position. This causes motor to pump molasses into the mixing chamber. And when the supply of feed is exhausted, the switch is released, cutting off the molasses pump.—*Ralph Darrapp, Tacoma, Wash.*



Improved Line Spurs Output

By modifying the fresh-peeled potato line at Magic Spuds, Inc., Miami, Fla., snags were ousted and product is now processed without delay.

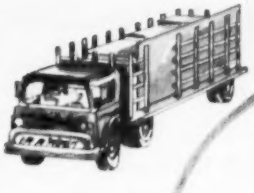
First the water-jet peeler (rotary drum with spray nozzles) was fitted with cleats. These created a tumbling action and prevented spuds from sliding back without being completely peeled. Also, number of jets was decreased from 20 to 7, but water pressure on each was increased.

The stainless mesh dryer belt (photo) had been troublesome because it had to derive traction from a smooth steel drum. The idea of using a rubber-lagged pulley was discarded for fear of having bits of rubber mixed with product. Use of greater tension was the solution adopted.

However, this caused the belt to curl up at the edges. When this occurred, small potatoes would be ground between the belt edges and the conveyor sides. Sometimes 1½ hr. were required to clean the belt

WEIGHT CONTROL IS COST CONTROL

and this scale saves money on every weighing!



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Unique construction guarantees longer life, more accurate weighing for rigid cost control. 2 and 4 section models, capacities to 50 tons, lengths to 60 feet. Find out how this scale—and other Howe equipment—can speed your weighing, cut your costs, increase your profits.

* PRINTED WEIGHT RECORDS!

The Howe Mechanoprint® ticket shows gross, tare and net weights. Avoids errors, provides permanent records.

Write for Complete Details

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THE HOWE SCALE CO. · RUTLAND, VERMONT

A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

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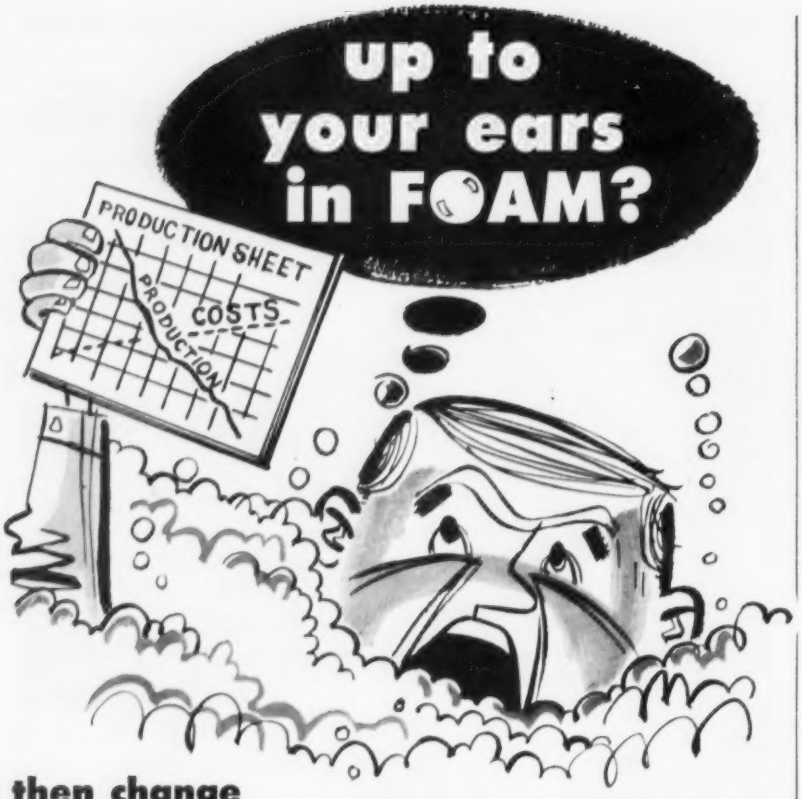

then change to a Dow Corning SILICONE DEFOAMER

Why continue to let foam rob you of valuable processing space, inflate your costs, smother your production schedule? Why indeed, when only a teaspoonful of a Dow Corning SILICONE DEFOAMER will prevent mountains of that wasteful foam . . . help you operate at full capacity.

Now there are two Dow Corning SILICONE DEFOAMERS for food processors—both so efficient they pay for themselves many times over:

ANTIFOAM A Compound—permissible to use in processing nonstandardized foods at concentrations up to 10 ppm.

ANTIFOAM AF Emulsion (water dilutable)—permissible at concentrations up to 34 ppm.

And remember, when you use one of these economical silicone defoamers, you also free yourself from the worry and mess of unsanitary boilovers and the extra maintenance costs that result. So—stop choking on your FOAM problems—change to a Dow Corning SILICONE DEFOAMER.

first in silicones

FREE SAMPLE

Put Dow Corning SILICONE DEFOAMERS to the test. Use the coupon below or write on your letterhead to receive a free trial sample. No obligation, of course.

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MIDLAND, MICHIGAN

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NAME _____

TITLE _____

COMPANY _____

CITY _____ ZONE _____ STATE _____

My foamer is

Oil system _____

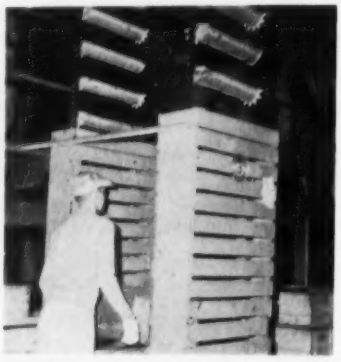
Aqueous system _____

Other _____

Practical Ideas

and area below after a production run.

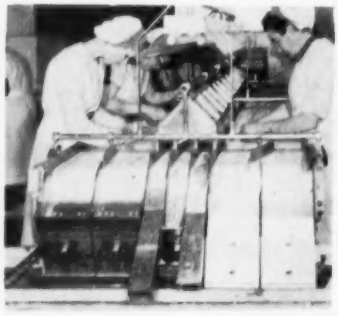
Wooden boards (1x4) C-clamped to the side walls now prevent the belt from curling up. No appreciable wear results on the belt. It has operated in this way 3½ yr.—*W. J. Holmes, Miami, Fla.*



Guards Bucket Pea-Conveyor

For safety's sake wooden guards were built around a bucket elevator at Libby's Wallaceburg, Ontario plant.

Both legs of the unit are covered (photo) to a height of 7 ft. This protects the worker who dumps peas from 30-lb. boxes, as well as all others on the pea-receiving dock during the season of great activity.—*FE Staff*



Five-Way Inspection Belt

Manually inspected nut meats of up to five different sizes or grades are separated on these company designed picking belts at Diamond Walnut Growers Inc., Stockton, Calif. And this stock is routed to final storage bins by an intricate conveyor-elevator system that retains original grade or size identities.

This is achieved by: (1) Having small hoppers, clearly marked as to

New CORRUGATED CONTAINER FOR LIQUIDS

easily filled

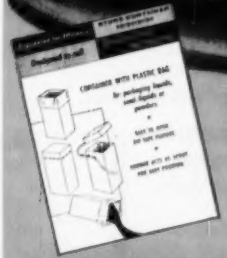
quick closure

tear tape opener

easily emptied

Saves 60¢ on Every 5 Gallons for Chocolate Syrup Manufacturer

This revolutionary new corrugated container, with inner plastic bag for shipping liquids or powder, offers substantial savings plus valuable additional advantages in storing, handling, packing and shipping. It was originally designed for one of America's leading chocolate syrup manufacturers. In actual use, it has resulted in savings of over 60¢ on every 5 gallons of chocolate syrup shipped with an overall saving of many thousands of dollars annually. If you ship a liquid or powder, this unique Stone Container offers the same possibilities for you. Here is something that should be investigated—immediately!



Send for New Free Brochure

Get the complete story of the many advantages of Stone's new container for shipping liquids and powder. Send for the factual report available, without obligation, to all manufacturers interested in improving their packing and shipping of these products.

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4222 West 42nd Place · Chicago, Illinois
Sales Offices in Most Principal Cities

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Gentlemen: Please send me without obligation, your brochure on the Stone Container with inner plastic bag for shipping liquids and powder.

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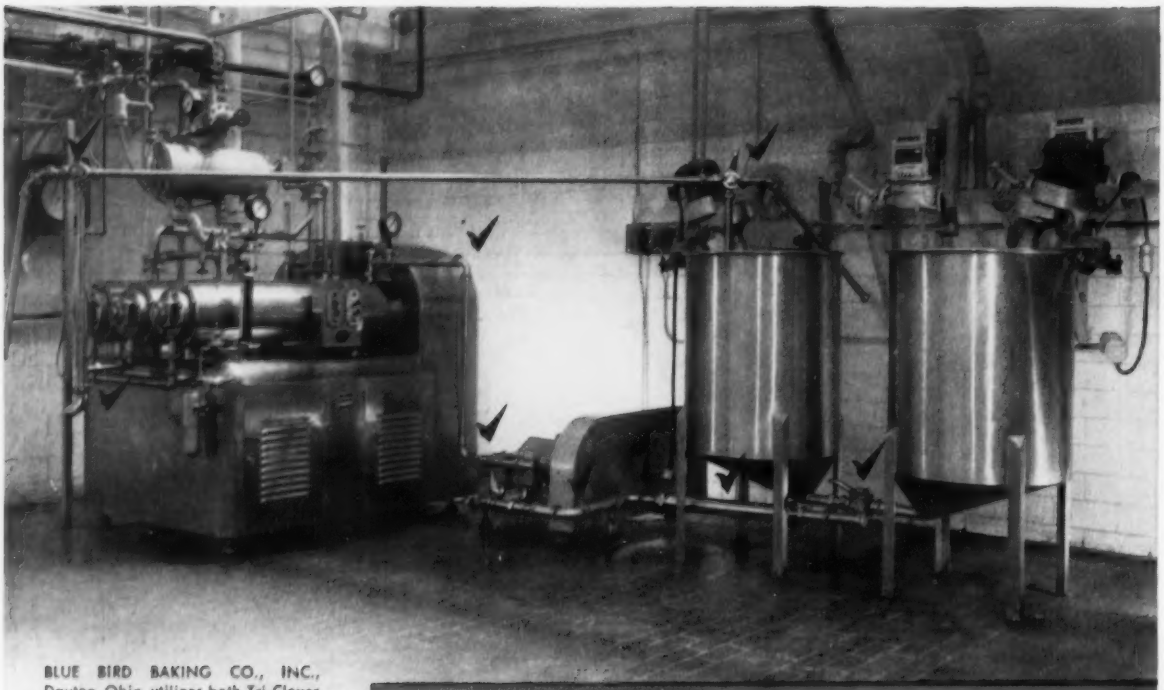
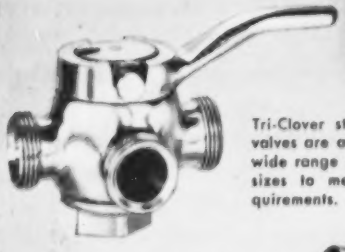


BLUE BIRD BAKING CO., INC., Dayton, Ohio, utilizes both Tri-Clover Standard Sanitary and TRI-CLAMP® Fittings and Valves, as well as a Tri-Clover Filter, in this mixing tank setup, where pie fillings of various types are mixed for the well-known Blue Bird pies.

TRI-CLOVER SANITARY FITTINGS and PUMPS

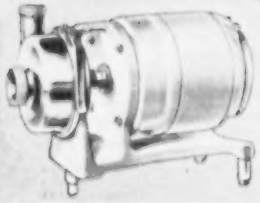
help bakeries *"plan for progress"*



Tri-Clover stainless steel valves are available in a wide range of types and sizes to meet your requirements.

A complete line of standard sanitary threaded stainless steel fittings is available for use in the baking industry.

Thin wall, light gauge stainless steel tubing from Tri-Clover gives strength, light weight and overall economy to your conveying line installation.



Tri-Clover Sanitary Centrifugal Pumps, fabricated of highest quality corrosion-resistant metals, are widely used to meet baking industry requirements for efficiency and long-term service.

Tri-Clover has for many years made a complete line of stainless steel sanitary fittings, valves and pumps for the dairy and food industries. This complete line is available for use by the baking industry in handling liquid sugar, syrups, water, milk, frosting and other baking ingredients.

To help you "plan for progress," in meeting the demand for new and improved baking operations, Tri-Clover can meet all your piping and pumping needs relative to installation of liquid ferment, or brew, processes, as well as for pneumatic flour handling systems.

Why not let Tri-Clover fittings and pumps help to achieve new standards of efficiency and sanitation in *your* bakery operations? Let our engineering staff help in solving your specific corrosion-resistant liquid conveying line problems. *Write for further information.*

LADISH CO.

Tri-Clover Division

Kenosha Wisconsin

See your nearest TRI-CLOVER distributor

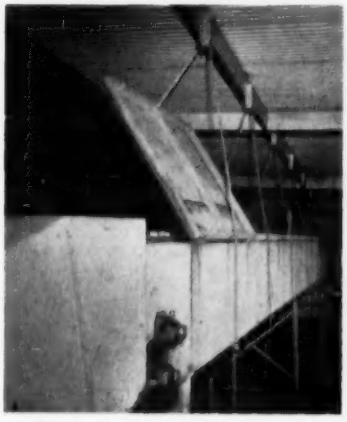
TRI-CLOVER

EXPORT DEPT.
8 So. Michigan Ave.
Chicago 3, U.S.A.

5656

grade or size of stock, directly before the operators, and (2) telescoping chutes that may be adjusted to discharge into one of 5 selected conveyor lanes.

Thus these operators may dispose of off-grade stock, previously missed by the electronic sorting machines. And they can sort the remainder by color and size, placing it in the correct hopper or permitting it to continue on the main sorting conveyor. The seven belts discharge into chutes that have been adjusted to feed any one of the five main take-away conveyors below.—*FE Staff.*



Lengthy Blancher Ups Quality

We built this blancher extra-long (Over 45 ft.) in order to give asparagus a slow, even cook that results in a high quality, uniform product.

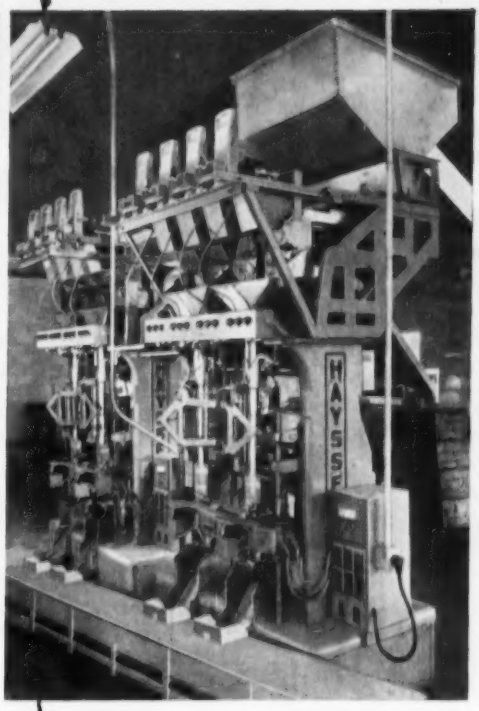
Easy access to the woven wire belt and steam jets for cleaning and maintenance is provided for by hinged covers (see photo). These can be opened by pulling on chains that are run through ceiling brackets. They are held open by slipping a chain-link through a slotted bar fastened to the bottom of the opposite side of the blancher.—*H. W. Tilghman, Plant Manager, Shoreland Freezers, Inc., Salisbury, Md.*

Drains Water Outside Freezer

Due to moisture on the floor of the pie-freezer room, trucks at Grable's Bakery, Miami, Fla., used to track water outside the room.

To remove these puddles, holes were drilled in the floor at the door threshold. Pipes were then shoved into the holes and down under the earth below the building. Drain holes

COMPAK high-production "Poly" Packaging continues to set new records for performance and economy!



Gressinger & Sons have produced over 25,000,000 perfect Polyethylene packages of radishes in one year's time on these two Hayssen COMPAK machines.

● No other packaging machine on the market can boast this record of production and dependability with polyethylene.

Whatever your product; solid, liquid or powder, we can produce a better package at less cost.

The simplified machine principle of COMPAK has made it first choice in every industry where perfect design register, accuracy and a true hermetically sealed package is necessary.

Let our experienced packaging engineers help you with your polyethylene packaging problems. Contact us TODAY and see how easily COMPAK fits into your operation.

HAYSSEN

MANUFACTURING COMPANY • Dept. FE-10 • SHEBOYGAN, WIS.

first in Automatic Packaging Since 1910

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FUTURE

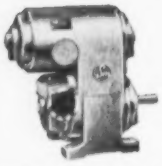
IS BUILT INTO...

...STERLING SPEED-TROL VARIABLE SPEED MOTORS

Sterling Speed-Trol Variable Speed Motors are fundamental to the success of any manufacturing operation involving changing production conditions. Speed-Trols give machinery the versatility which assures optimum productivity regardless of manufacturing variables. They also prevent obsolescence of machinery due to changes in processes or production volume. As insurance against future or unanticipated changes, it will pay you to investigate Sterling Speed-Trol Variable Speed Motors. They have your production future built into them.

Write today for Bulletin No. 188. Discover the big advantages Sterling Speed-Trol Variable Speed Motors can bring to your plant.

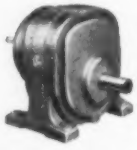
Sterling offers you a wide range of Electric Power Drives of advanced design—variable speed or constant speed—with manual or automatic controls.



STERLING SPEED-TROL VARIABLE SPEED MOTORS

STERLING SLO-SPEED GEAR MOTORS

STERLING CONSTANT NORMAL SPEED MOTORS



STERLING MULTI-MOUNT SPEED REDUCERS

STERLING ELECTRIC MOTORS

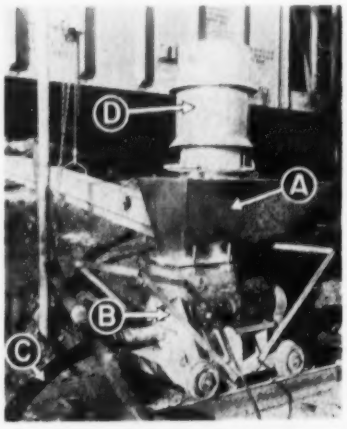
Los Angeles 22 • Chicago 35 • Cincinnati 37 • New York 51

Practical Ideas

had been previously drilled in the portion of the pipe below the surface.

Cross-channels were cut into the concrete to lead water into the pipes. Finally a steel plate was placed over the drainage area leaving 2 in. of exposed channel area on each side. The slightly concave plate rolls with each passing truck, thus keeping drainage lines open.

A 2 ft. section of floor, the width of the doorway, is given over to this drainage device.—*W. J. Holmes, Miami, Fla.*



Car to Van Flour Unloading At Elevated RR Siding

How to transfer flour from an Airslide car to a van at a railroad siding running 5 ft. above the roadway proved to be a knotty problem for Clarke Bulk Transfer, Norristown, Pa.

By cooperating with the Fuller Co., Catasauqua, Pa., they were able to come up with a solution that involves the use of an Airslide fluidizing conveyor and a unique pneumatic transfer unit dubbed the "trolley line" conveyor.

When a car is to be unloaded the unit is rolled out of its steel shed housing along a narrow gage track. The Airslide component (supported by a chain from a swivel boom) is hooked up to the car's discharge opening.

Air hoses and conveying lines are connected and the flour flows, by gravity, into the surge hopper (A) of the trolley, through a rotary feeder (B), and into a loading nozzle at the top of the van via a flexible rubber hose (C).

Flour dust is collected by a breather (D) on the surge hopper

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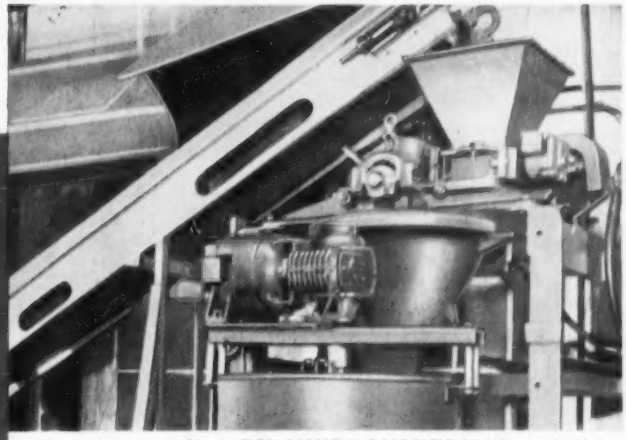
From Horse-radish...

to Rocket Fuel...

Mikro-D Handles the *HOT ONES!*

• Custom engineered MIKRO-PULVERIZER installations are handling the *hot* ones for industry everywhere. They put the bite on horse-radish, while keeping it cool as a cucumber, and grind touchy potassium perchlorate for rocket propellants. Special installations have been designed to process virtually every type of material and to meet the most exacting product specifications. What's more, they are available in a wide range of sizes, from small laboratory mills, ideal for product testing, to high capacity units capable of meeting the highest volume requirements. Quality and fineness of grind can be duplicated on every size unit in the MIKRO-PULVERIZER line, permitting accurate prediction of results in advance.

If you would like to see for yourself what a MIKRO-PULVERIZER can do for your product, send us a sample. We'll grind it to your specifications, and perhaps help you discover how to put more profit in your production.



No. 2DH MIKRO-PULVERIZER grinding horse-radish in a food packing plant.

BULLETIN 51A

describes the complete MIKRO-PULVERIZER line. The principle of operation and typical applications of MIKRO-PULVERIZERS are discussed in detail.

Why not send for your copy today?

Mikro-D

GENUINE MIKRO-D REPLACEMENT PARTS AVAILABLE FROM STOCK WITHIN 48 HOURS.

PULVERIZING MACHINERY DIVISION

METALS DISINTEGRATING COMPANY, INC.

97 Chatham Road • Summit, New Jersey

MANUFACTURERS OF PULVERIZING, AIR CONVEYING AND DUST COLLECTION EQUIPMENT

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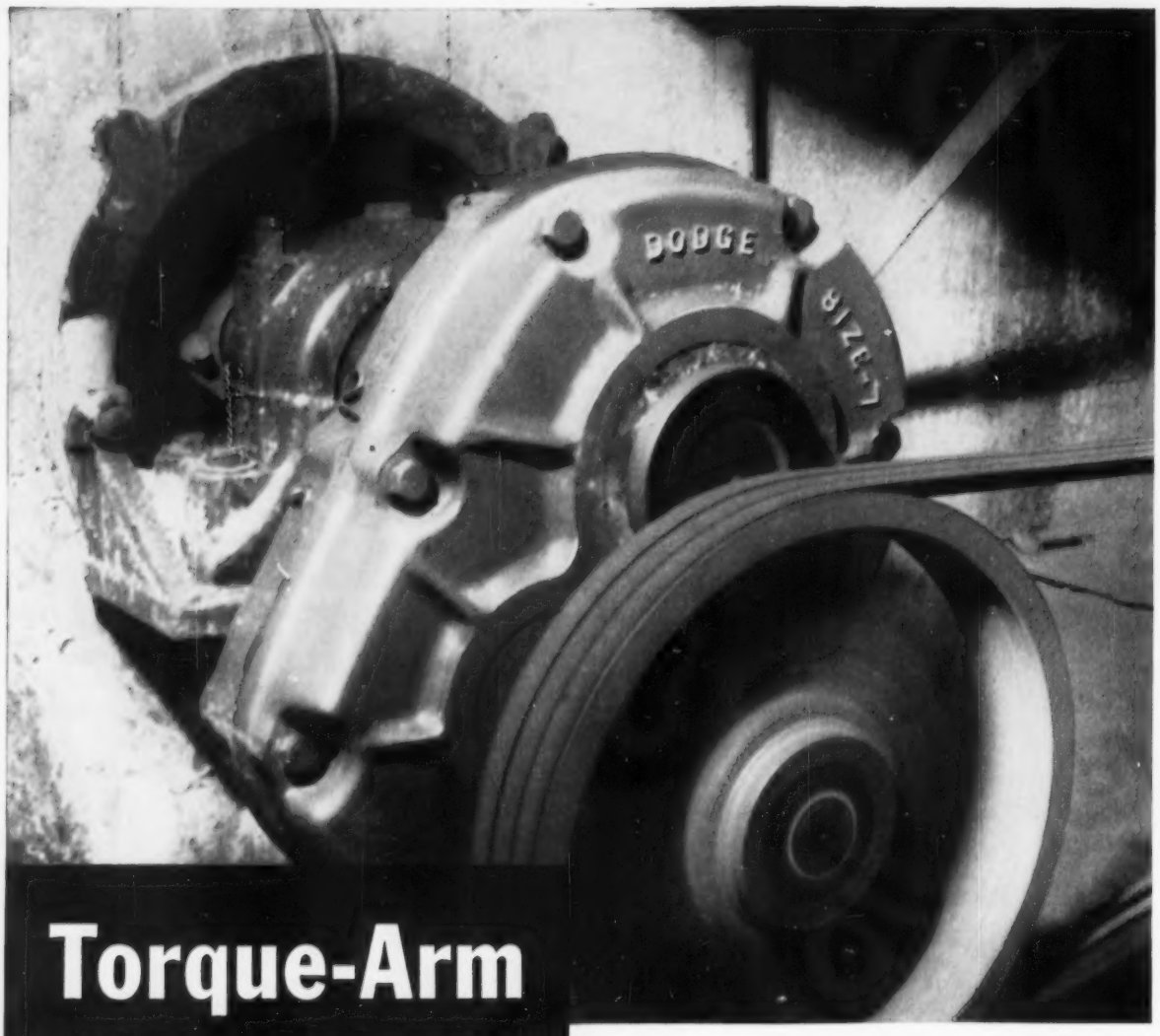


Torque-Arm

SHAFT-MOUNTED SPEED REDUCERS

Save Up to 1/3 in Installation —Deliver 97% Efficiency!

Easy to install! Mounted directly on the driven shaft. Locked at both ends. Dodge Torque-Arm Speed Reducer requires no foundation, no flexible coupling, no sliding base, and there's no lining-up problem. Amazing economy is matched by efficiency in operation—up to 97%.

Unit is driven through V-belt drive. Stock Taper-Lock Sheaves prescribed for each job, permit speed ratios required. Tri-Matic Overload Release and backstop available, if desired. Dodge Torque-Arm is America's most complete line of shaft-mounted Speed Reducers. Ask your Dodge Distributor—or write us.

•

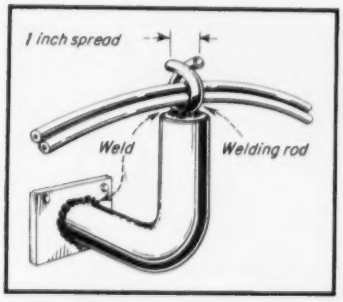
DODGE MANUFACTURING CORPORATION
2800 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new methods. Look for his name under "Power Transmission Machinery" in the yellow pages of your phone book—or write us.

DODGE
of Mishawaka, Ind.

and dust filters on the trailer. Air supply comes from positive rotary blowers on the van.

The vans are equipped with pneumatic conveying equipment for automatic unloading at the bakeries. This has a variable speed drive that can be adjusted to suit the capacity at the delivery point.



Welded Hose Support

Here's a handy hose support you can make. The open ring permits hose to be removed easily, yet it can't slip out. Mount the support on your welding table or on the wall to keep hose out of the way and protect it from damage.—*Linde Tips, Linde Air Products Corp., New York.*

Bumps Meat From Bucket

Here's a meat dumping arrangement in use at several Danish plants.

A 160-lb. bucket of meat is placed on a perforated footplate (see photo). A steel wire (partly enclosed in a rubber hose in order not to damage the stainless steel bucket) is then slung around it. This wire goes around a pulley on each side of the frame and is connected to a triangular yoke.

The yoke is turned by an air-operated winch. Pressing a button operates the winch, lifting the bucket. The wire, just over the handle, pre-

PECTINOL

Pectic Enzymes

for better juices at no extra cost

PECTINOL natural enzymes hydrolyze and solubilize pectins, aiding nature in producing fruit juices of sparkling brilliance . . . faster and in greater yield. PECTINOL helps clarify apple and other fruit juices, wines, vinegar, fruit extracts and concentrates. PECTINOL, added to the crushed fruits, speeds pressing, improves color extraction, increases the yield, and speeds filtration and over-all production. PECTINOL prevents premature gelation of juices during concentration and provides a beautifully clear concentrate which produces jellies of sparkling clarity and full natural flavor.

If you want to give your juices extra sales appeal and give your production a boost at no extra cost, then write Dept. SP for full information on PECTINOL pectic enzymes.

PECTINOL is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.

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Low-cost quality insurance . . .

Filter liquid sugar...

TURBIDITY

. . . out of your processing picture

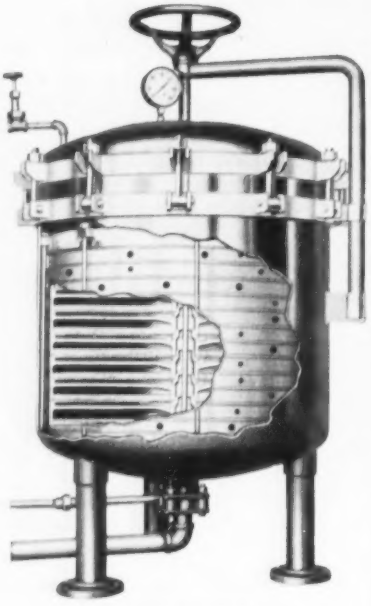
You can eliminate liquid sugar turbidity which may be impairing your product's flavor, aroma, clarity and shelf-life, *quickly and economically* in your own plant, with a Sparkler Horizontal Plate Filter—the refiner's own choice for reliable, efficient polishing performance.

Sparkler's *exclusive* horizontal plates provide complete stability to the cake with no danger of cracking or break through, even with pressure variation or complete shut-downs and start-ups. A thin even pre-coat can be applied to Sparkler's horizontal plates with low pressure, and a low density, porous cake built-up to assure high flow with fine sharp filtration throughout the cycle.

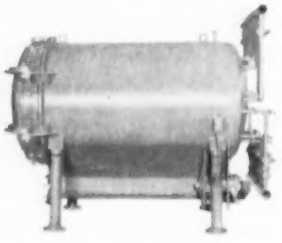
Completely stainless steel filters having access to all plate surfaces for thorough cleaning fulfill food industry sanitation requirements.

Design variations of the Standard Horizontal Plate Filter enable sugar units to be offered in a wide range of models and capacities at economical prices.

WRITE SUGAR DEPT. for additional information on Sparkler's complete line of sugar filtration equipment.



The SPARKLER Standard Horizontal Plate Filter



The SPARKLER RSC sugar refinery filter

SPARKLER FILTERS

SPARKLER MANUFACTURING CO.
Mundelein, Illinois

Sparkler International Ltd.
Plants in Canada, Holland, Italy and Australia.

Representatives in principal cities throughout the world

Filtration Engineering Exclusively for Over 30 Years

Practical Ideas

vents the pail from dropping into the cutter.

Pressing another button lets the air escape, and the bucket slides back down. By repeating the up and down movements the meat can be "bumped" out of the bucket.—*A. F. Bakker, Industrial Engineer, Plumrose, Ltd., Copenhagen, Denmark.*

Eyecatching Promotions

Here are two visual aids for getting a message across in a hurry.

The first (upper photo) is in evidence at the A-1 Brewing Co., Phoenix, Ariz. Here, interesting signs highlight various items of interest throughout the plant. Painted in such conspicuous spots as the ends of tanks, they appeal to groups going through the plant on the popular tours.

when you count
what contaminated meat
costs you

EQUIPMENT OF CRUCIBLE STAINLESS COSTS LESS

The expense that contaminated meat adds to an operation can frequently be reduced by using equipment made of Crucible Stainless Steel. That's because flavor is never altered, and meat is never discolored by Crucible Stainless. Stainless never chips, peels, or dissolves into food either, even when exposed to amino and fatty acids. That's why it lasts longer — reduces replacement costs.

Exceptional corrosion resistance explains these valuable properties. In fact, no meat, no matter what corrosive acids it contains, can break down the smooth shiny surface of Crucible Stainless Steel. It effectively eliminates the corroded crevices that catch food and give contamination a start. It's easy to see why Crucible Stainless so often cuts down costly product waste.

Cleaning is economical too, with Crucible Stainless. It cleans 5 times faster than any other metal in commercial use today, and it comes clean so thoroughly that stainless equipment can be used on many jobs because flavor never transfers from one product to another.

Corrosion resistance and easy cleaning are just two of many properties of Crucible Stainless which make it, in the long run, the economical choice for meat packing equipment. For more information, write for free 24-page booklet discussing the use of Stainless Steel in the meat packing industry, or contact *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

Lactose enhances flavors.

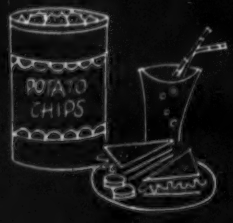
Acts as an excellent aroma catcher.

Serves as a pigment

absorbent.

Provides uniform browning and

caramelization.



And, gives you

unique health properties.

Just think what Lactose can do for your product!

Works wonders on everything...from roquefort cheeses to barbecue mixes. The new pricing pattern on milk sugar makes this amazing product a practical ingredient for hundreds of foods.

Lactose is a low sweetening, free flowing, crystalline sugar. It tenderizes, holds freshness, aids in dispersing and drying, and is not fermented by brewer's yeast.

Western Condensing Company manufactures Edible, U.S.P. and Fermentation milk sugar in granulations tailor made for your specific use.

For further details, sample and prices please write Technical Sales Dept. 117.

Remember, our coast-to-coast manufacturing and distribution facilities assure dependable supply and efficient service.

FOREMOST

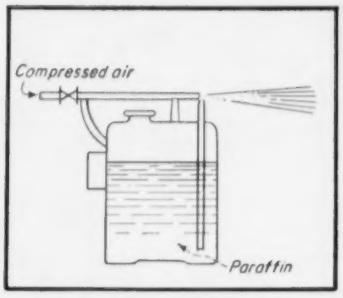
lactose

WESTERN CONDENSING COMPANY

Appleton, Wisconsin

A WORLD-WIDE SUPPLIER OF HIGH-QUALITY MILK DERIVATIVES

A solution is offered (above) to those whose advertising efforts have been stymied by the lack of billboards on new turnpikes. Mobilboard, Inc. of Des Moines, Iowa has come up with a new traveling billboard that mounts on the rear of fleet-operated semi-trailers. Offering a media that can't be ignored, thrown away, or turned off, each sign measures 30×84 in., and is mounted, kept clean, and maintained by the company.—*FE Staff*



Easy-on, Easy-off Insulation

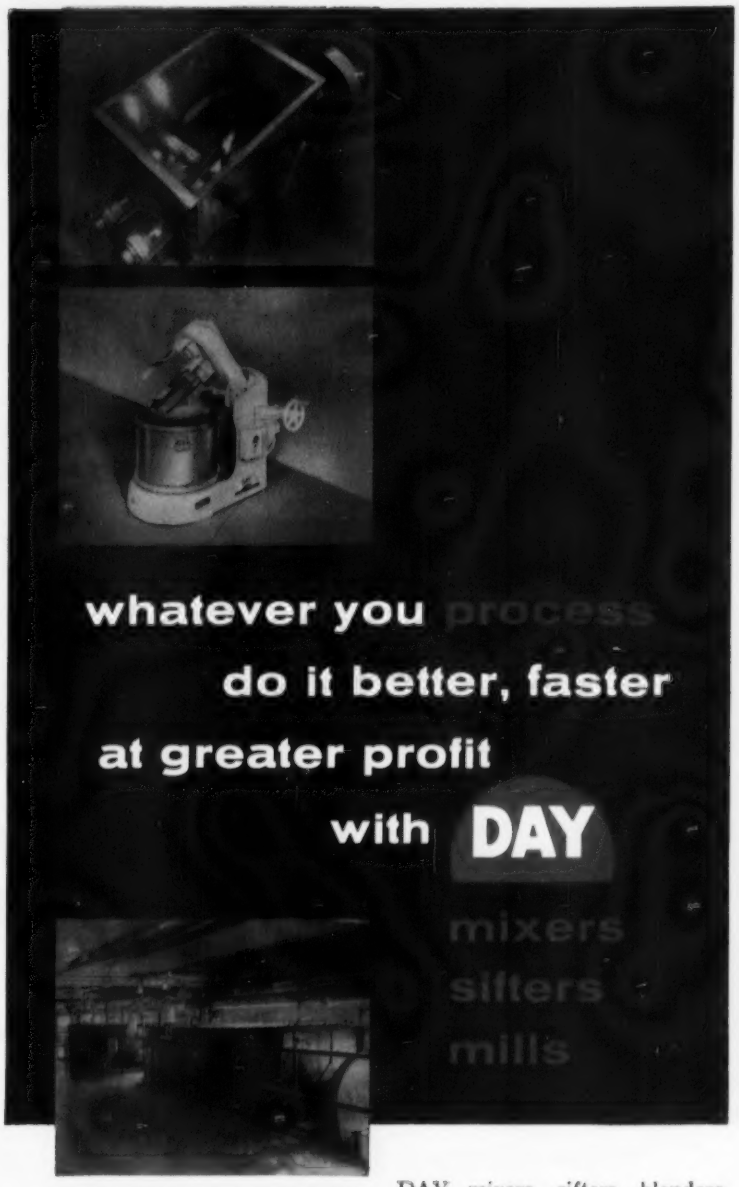
Of great importance, especially in the tropics, is the insulation of lines to a vacuum gas-compressor. This prevents a decrease of capacity by warming up the gas.

But in routine maintenance, and in case of accidents, it may be necessary to remove the insulation. You should then reinsulate as soon as possible. The problem is that it is not always easy to work quickly, especially with cork insulation. Moreover, removing and reinsulating can prove quite costly.

In such cases application of paraffin (m. p. 125F.) has worked well. It can be applied while molten by means of an improvised blowgun (see sketch). Here are some reasons for using this method:

1. An isolating cover is obtained immediately.
2. The material is cheap.
3. It can be used again.
4. The apparatus is simple and easy to construct. (The vaporizer can be built into a pail or jerrycan, and connected to a compressed air line).
5. Paraffin can be removed quickly and reinsulation is ready in a moment.

Use this method on less accessible places, and also when the insulation has to be removed often. And be sure to have a means for regulating the air pressure.—*F. P. van Ravenswaay, Refrigeration Engineer, The Netherlands.*



DAY mixers, sifters, blenders, roller mills and pilot plant equipment are found in every major process plant, helping produce better products, that sell more profitably. Manufacturing techniques that achieve a high degree of efficiency allow you to purchase Day equipment economically. Lab facilities are available to test your product. Equipment Catalog sent on request.

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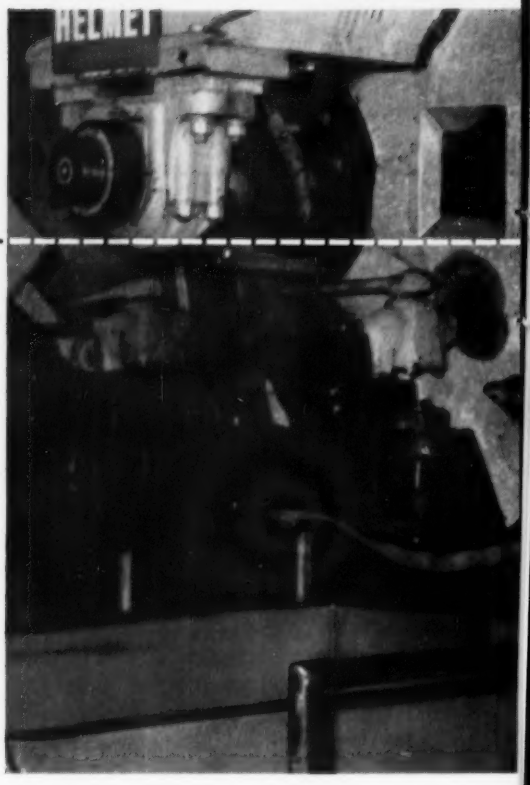


The *ElectroniK* recorder provides a complete record of the rendering operation. Dr. L. J. Pircon, who developed the system, explains the recorder's function to an operator.

ElectroniK recorder.

. . . In Dry

use the New AMIF thermal control

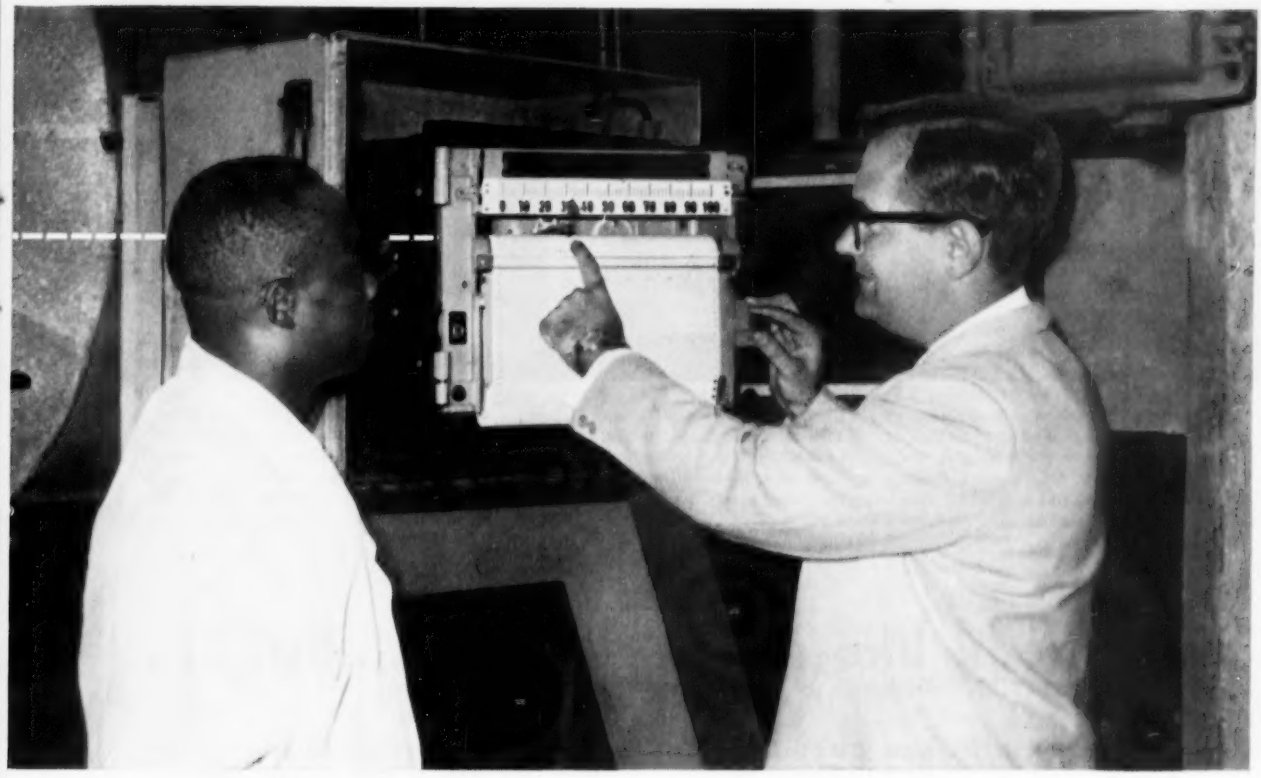
INSTALL THE AMIF THERMAL CONTROL SYSTEM IN ONE DAY

After holes are cut in renderer walls, sleeve is welded into place . . .

the sensing element is then screwed into the threaded sleeve, and . . .

leads from the sensing element are connected to the *ElectroniK* recorder.

(All photos courtesy of American Meat Institute Foundation)



Rendering

system for consistently high product quality

End-point control in dry rendering of lard and inedible fats is now a precise, foolproof operation with a new system developed by the American Meat Institute Foundation.

In providing *direct* measurement of liquid fat temperature, the AMIF Thermal Control System prevents over- and under-cooking . . . assures perfect, high-quality rendering.

The system consists of a sensing element located in the melter wall and an *ElectroniK* strip chart recorder. The rugged, easily installed sensing unit is extremely sensitive to product temperature changes. It flashes the complete rendering story to the recorder. The recorder keeps a continuous record of what goes on in the renderer . . . shows at a glance when end-point is near or has been reached. It even reveals temporary stops in melter paddles.

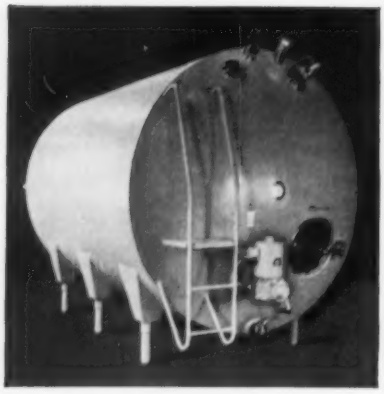
The system can be equipped with automatic control to sound an alarm, shut off steam and dump the cooker load at the critical temperature level.

Your nearby Honeywell sales engineer can give you complete information on the new AMIF Thermal Control System. Call him today . . . he's as near as your phone.

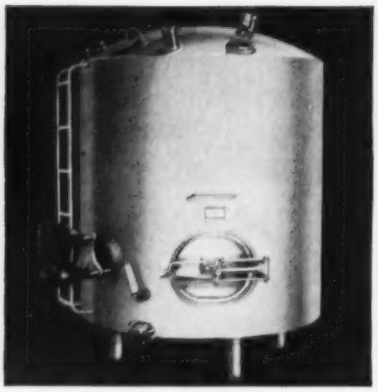
MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

Honeywell

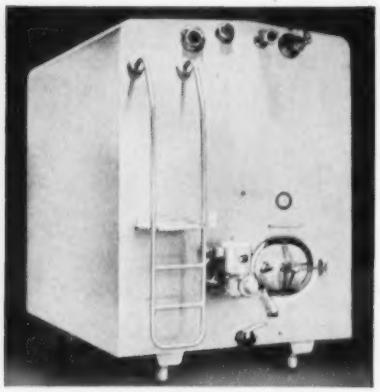
H HONEYWELL *First in Controls*



Cherry-Burrell horizontal insulated tanks for maintaining product temperatures; or with channel wall surface for preheating or precooling to reduce peak demand loads. Air or mechanical agitation. Standard capacities to 10,000 gallons. Special sizes available. Bulletin G-496.



Cherry-Burrell vertical insulated tanks for maintaining product temperatures; for preheating or precooling to reduce peak processing loads. All types of agitation. Save floor space. Standard capacities to 3,000 gallons. Special sizes available. Bulletin G-496.



Cherry-Burrell rectangular (super space-saver) insulated tanks for holding, heating and cooling. Can be arranged in banks for complete utilization of floor space. Standard capacities to 5,000 gallons. Specials upon request. Bulletin G-481.

All 6 look like storage tanks . . . BUT . . .

These Cherry-Burrell Stainless Steel Tanks are far more than mere storage tanks. They can be process vessels for handling a wide variety of liquids and semi-liquids . . . *in a wide variety of ways.* Ideal where sanitation and/or corrosion resistance is important.

For example, you can use them to provide "surge" for heating and cooling operations in continuous processing systems . . . to blend and preheat . . . to formulate and hold . . . to mix, heat or cool.

However you use them . . . or wherever . . . Cherry-Burrell Stainless Steel tanks can save you time and labor through controlled "in-tank" processing during off hours.

Full range of sizes (from 60 to 10,000 gallons), shapes and types available for early delivery. Ask your Cherry-Burrell Representative for details. Or write for literature.

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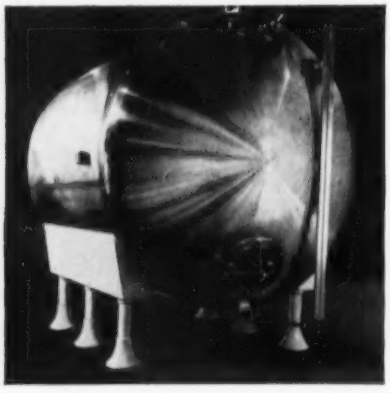
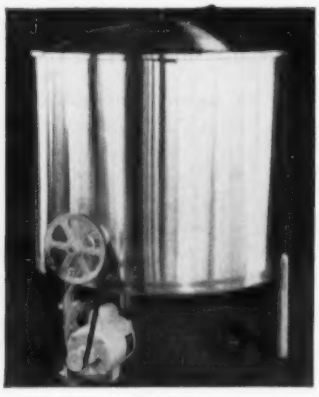
Cherry-Burrell single-shell vertical tanks. For holding, mixing or blending of one or more products. Available with or without agitation. Uninsulated. Standard capacities to 3,500 gallons. Special sizes available. Bulletin G-506.



Cherry-Burrell horizontal single-shell tanks for holding, mixing or blending liquid products such as syrups, liquid sugars, corn syrups. With or without agitation. Uninsulated. Standard capacities to 5,000 gallons. Special sizes available. Bulletin G-506.



Cherry-Burrell open-top single-shell tanks for "surge" storage, side or bottom mixing. "Reverse dish" bottom. Standard capacities from 60 to 500 gallons. Special sizes available. Bulletin G-502.

More Than Processing Involved in Efficiency

You hear a lot about improvements in processing and their cost-cutting benefits. It is natural to focus attention on equipment that produces the product. So we glamorize new methods, faster machines, and automation.

That is as it should be. Food companies always will profit from progress along these lines. But behind the process are many critical facilities that merit just as much management and engineering attention. Yet all too often these receive only cursory treatment in our field.

Several ways to waste electrical $$

Take your plant electrical system, for example. Volts and amperes are always there at the flick of a switch—or nearly always. When failure occurs, production stalls, there's great excitement, and an electrician is dispatched posthaste to clear up the trouble.

But electricity can be there and still be unsatisfactory from cost and performance standpoints. Voltage frequently is too low for best machine operation. Why? Because the wires that carry it are overloaded. Odds are, too, that the electrical power factor is too low, making the electrical bill higher than it need be.

It may well be that you are writing off an electrical investment that is unnecessarily high. If you are distributing at 220v. instead of 440, you paid for extra copper in your wiring system. Electrical wires are like water pipes, the higher the pressure the more quantity a given size will carry.

Lack of good planning in locating electrical load-distribution centers results in longer wires than would be necessary. Failure to closely calculate and specify motor sizes not only means that you buy too much horsepower but that your motors operate inefficiently.

And many other hidden losses

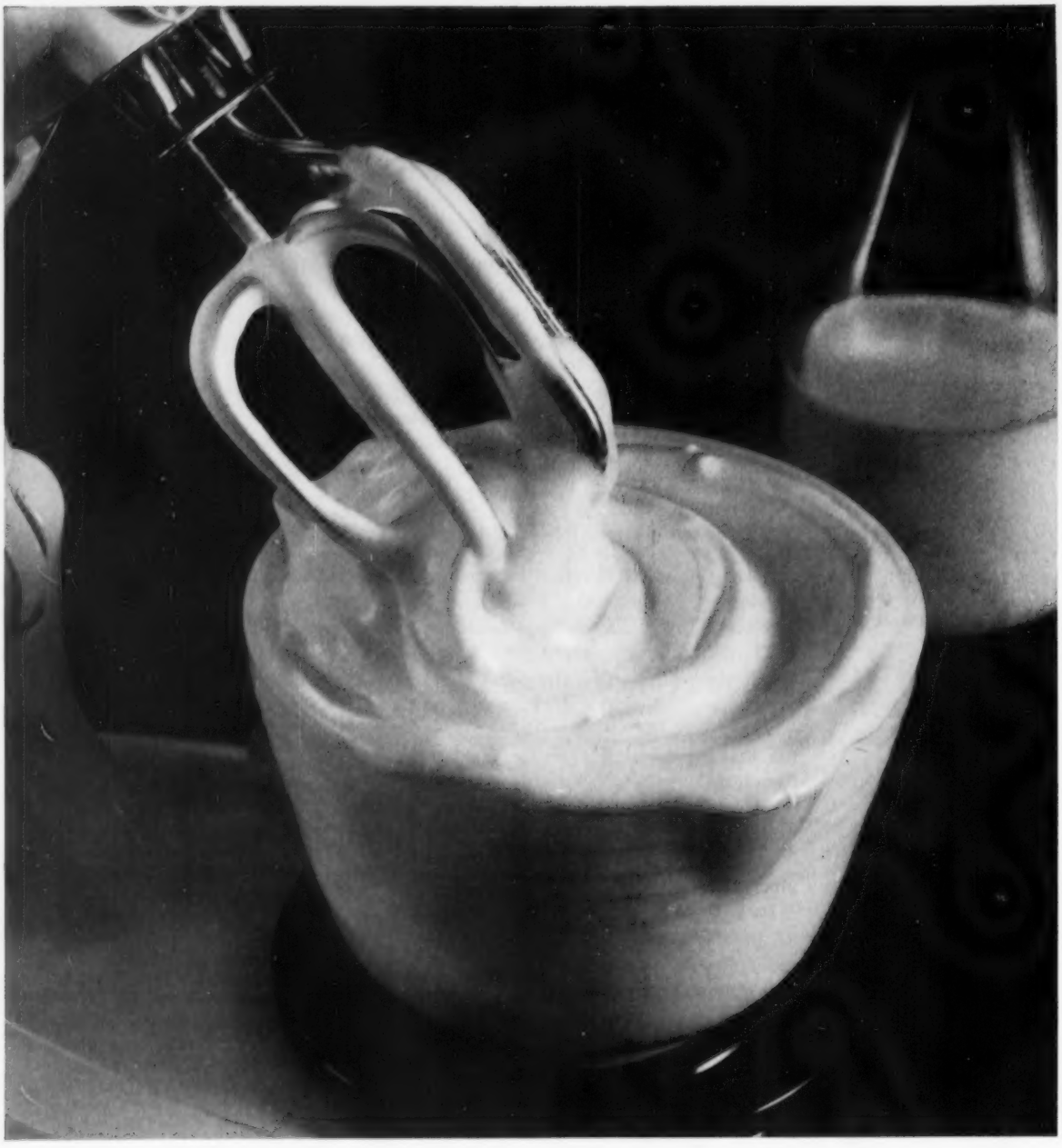
Electrical systems are but one example of the high cost that can be incurred when you neglect the facilities behind the process. There is a host of others. Poor floors require expensive maintenance; are difficult and costly to keep clean. Inadequate ventilation fogs up a process area. Some types of steam generating and heating systems are more expensive and less efficient than others. And so it goes.

You might call those "hidden" inefficiencies. But there are other highly important factors that lie right out in the open, yet often are overlooked. Among these are plant location and the arrangement of shipping docks, process areas, and storage spaces in relation to each other.

Because of the highly important role that non-processing features play in successful factory operations, FE has prepared for you a special report describing the advanced facilities of several outstanding new food plants (see p. 105).

Here is something to sharpen your appreciation of possibilities for improvement that too often are neglected in the food industry.

Hidden-cost dollars are just as valuable as the obvious ones.



This is *whipped* homogenized milk

You do it by incorporating a bit of *Myverol® Distilled Monoglycerides* with the milk and beating to a nice, dry, whipped dairy product. It works with other milk products, too. Anyone interested in the possibilities of creating dairy- or vegetable-based toppings with Myverol Distilled Monoglycerides should write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York, Chicago, and Memphis • W. M. Gillies, Inc., Los Angeles, Portland, and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

distillers of monoglycerides made from natural fats and oils

Also . . . vitamins A and E . . . some 3600 Eastman Organic Chemicals for science and industry

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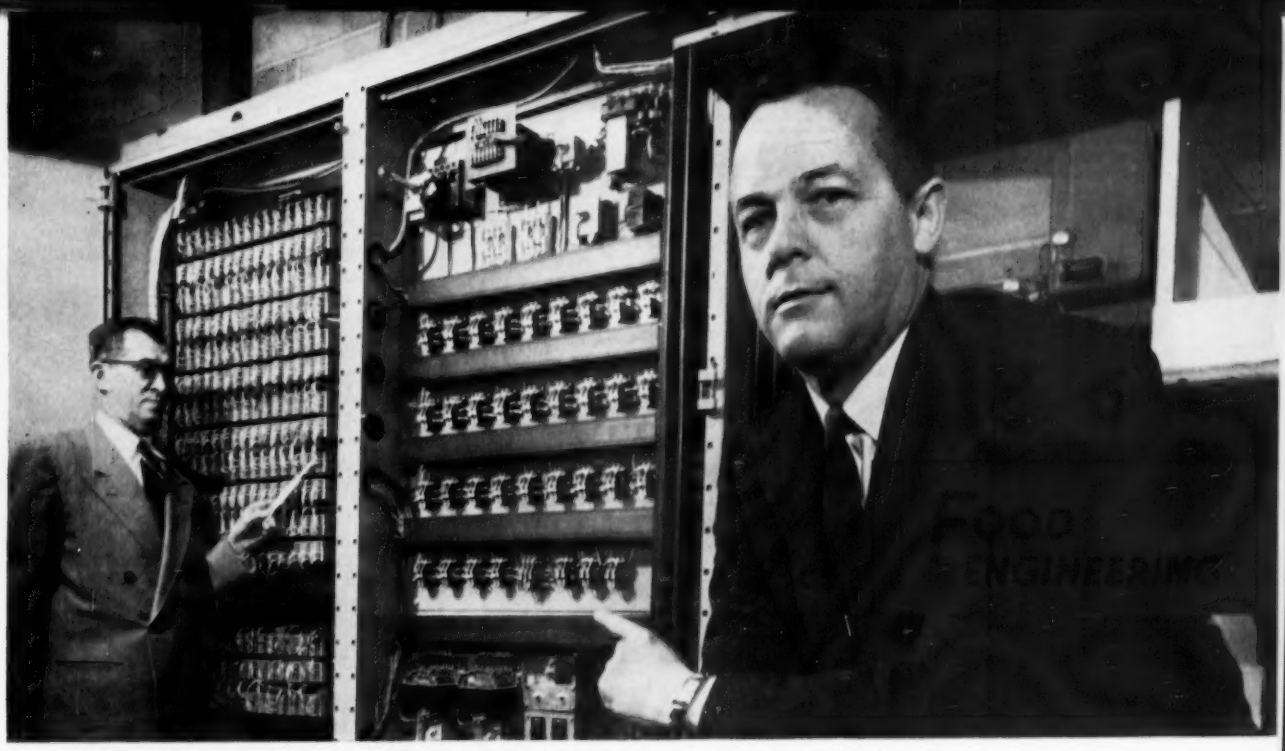


FOCUS ON KEY CONTROLS that electronically route Chelsea's vari-item cases directly into outbound carriers. Product-sensing circuits are pointed out by V.-P. Holmes (right). New Cypak static control blocks are indicated by L. L. Bosch of Bosch & LaTour, firm that conceived and designed system. These units virtually eliminate conventional relays to simplify the circuitry and minimize maintenance.

Foods go right from line to dock as—

'Memory' Units Robotize Case Flow

Handling costs are slashed as electronics sort many varieties of premixes, then dispatch cases over live-storage conveyors to shipping . . . System's punch-tape circuits and coding-decoding units seen triggering other applications

JOHN V. ZIEMBA

Associate Editor, "Food Engineering"
Photos courtesy Westinghouse Electric Corp.

RISING DISTRIBUTION COSTS now have progressive managements eagerly looking for new ways to hold the profit line.

Particularly, in-plant handling of multi-item cased goods is being checked and rechecked for possible shortcuts.

Hence the tremendous interest in a new electronic case-routing system that combines the latest commercial "memory"-circuit controls and is "tailored" to a plant's requirements.

In the first installation, made at Chelsea Milling Co., Chelsea, Mich., over 80% of each day's production of various consumer-type bakery premixes is now shipped directly from "live" storage.

And the remainder is efficiently channeled into floor storage, which serves two important purposes—temporary holding of items not produced every day, and handling of short seasonal cycles.

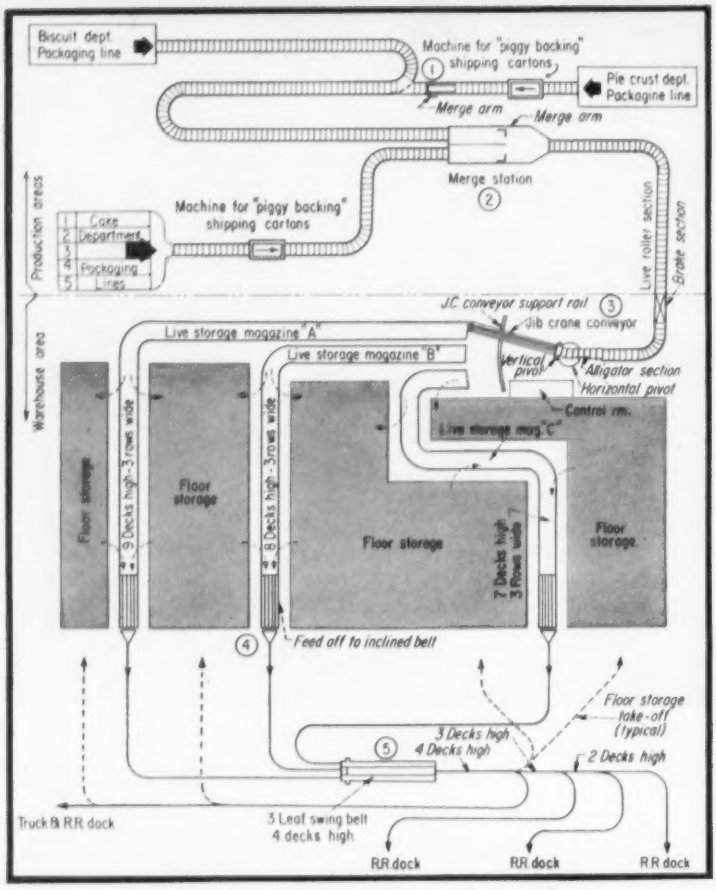
Of course, the ultimate in handling efficiency would be automatic, non-stop conveying of all cartons from packaging lines right into outbound carriers, thus eliminating storage.

True, such streamlining may not yet be applicable to all of a plant's case flow. However, management is keenly aware of the many economies of such direct, undelayed movements, and is applying the technique wherever feasible.

Thus Chelsea's setup might well be called "tomorrow's warehouse today"—for the operation constitutes a real breakthrough in automated case handling.

Briefly, the system employs paper-punch tapes as "memory" circuits, automatic elevator control for jib-crane operation, and recently developed static control units (Cypak, Westinghouse Electric Corp.)

The latter perform coding, decoding, and other operations that otherwise would require high-speed relays with many multiple contacts. Having no moving parts, these elements are



Mechanics of Non-Stop Case Flow

In production area (top), cases from biscuit and pie-crust lines merge at (1), while cake-mix cartons enter at main merge station (2). With their identity and sequence recorded, all cases are fed by jib crane (3) to predetermined conveyors in "live-storage" magazines. Cases discharge to inclined belts—as at (4)—then enter swing belt (5), which serves any of four loading docks.

not subject to wear and corrosion. In replacing conventional relay circuits, they materially simplify the design and minimize maintenance requirements.

Engineered by Bosch & LaTour, Cincinnati, the new system—

A. Identifies up to 31 varieties of product.

B. Memorizes the sequence of case flow from three lines, and

C. Dispatches cases according to a pre-set loading schedule.

Specific benefits of the setup? Chelsea lists these six:

1. Eliminates extra handling. Formerly, stock first had to be transfered to an inconvenient warehouse half a block away, the cases being loaded onto skids and sent over by fork-lift or motor truck. Then, of course, they all had to be handled again in the loading of outgoing shippers.

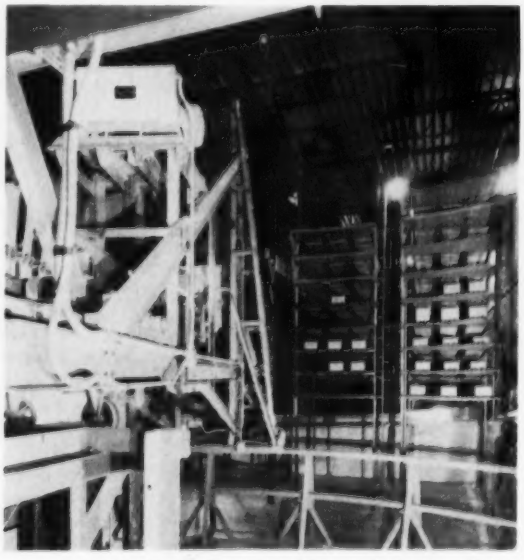
2. Replaces manual labor by mechanized conveyor handling and storage.

3. Steps up production by about 30%, with a nominal reduction in manpower. What's more, further efficiencies are anticipated as other packaging lines are installed.

4. Cuts warehouse floor-handling of cased goods about 80%, and effects considerable floor-space savings.

5. Provides for FIFO (first in, first out) operation.

WHICH CASES GO WHERE is predetermined by line-cord setting on this jib-crane dispatch board. Acting on electronic instructions from "memory" units, it actuates automatic elevators that position . . .



. . . **MONORAIL-MOUNTED JIB CRANE** to deliver pre-set type and quantity of cases to any one of 72 "live-storage" conveyors housed in 3 magazines (background). Latter provide some 11,000 ft. of storage.

6. Synchronizes the scheduling of production with shipments.

Furthermore, it's expected that the new technique will ultimately reduce damage to merchandise by a full 25%.

System in Action

As shown in flow diagram, cartons originate in the production area, which houses three premix packaging departments—cake, biscuit, and pie crust.

Packed cartons from these departments travel to the plant's warehouse section (on powered and gravity conveyors) through two automatic line-combining stations (Merg-A-Flow, Alvey-Ferguson Co.). In the warehouse, a special automatic (hence unattended) jib crane dispatches cases to magazine-type live-storage conveyors.

This crane and its electric circuitry are designed to sort and handle 31 different products at a rate of 40,000 cartons a day. Live storage consists of 72 roller-conveyor lines arranged in three magazines, which provide some 11,000 lineal feet of case-storing space. Currently, 15 varieties of premix are being run at Chelsea.

'Piggy-back' glueing machines set in the lines from pie-crust and cake departments bond two cartons together to form a 9x12x14-in. package. For items from these departments this technique doubles the system's live-storage capacity. However, with the larger-size biscuit-mix carton such "piggy-backing" isn't practical or desirable.

Operation of the stop-arm at junction of pie-crust and biscuit lines is controlled by a photocell in the pie-crust line. Normally, the biscuit line is "on." But it stops when cartons accumulate and block the photocell. Then, after a short delay, the arm opens to release flow on the pie-crust line for a predetermined time.

These actions create a single-line flow, without reference to the sequence in which merging occurs.

The second merging station handles cases from the first-merged line (biscuit and pie crust) and the cake department. At this point, two stop-arms release flow on parallel conveyors one at a time. Interlocks and time-delay circuits for each arm clear the flow on one line before the other is opened.

Here again, sequence of carton flow depends only on relative production rates, the action being independent of the system's automation features.

"Brains" Take Over

Now, memory and automatic sorting controls come into the picture, immediately downstream of the second merging station. Here, a photo-detecting unit is activated each time a carton is released.

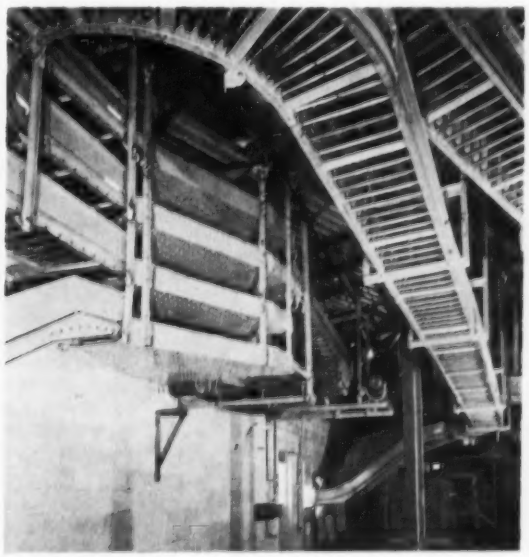
Cases passing this photocell enter an accumulation section ahead of the jib crane. A brake belt interlocked with the crane stops the flow whenever the jib-crane belt stops. Cartons are directed from the fixed incoming conveyor to the crane's movable tail piece by a flexible (alligator-type) section.

The crane conveyor has two belts: (1) A short horizontal section positioned by the crane to project a radial line to any of the 3-wide, 7-9 high conveyor rows in the magazine; and (2) a long hinged belt that discharges cases into any vertical row. The crane pivots on a center post, and is further supported by a wheel-mount operating on a section of monorail track.

At the tip of the conveyor boom are photo-transistor detection cells that initiate identification and dispatching circuits, also provide error checks on equipment performance and dispatch programming.

Cartons enter the magazines on skate-wheel plates and are released singly from the live storage over chutes to 3-wide inclined belts. A pre-set photo counter stops the belt or trips an alarm when a pre-determined count is reached. *(Turn page)*

AT DISCHARGE END of conveyor magazines, cases mount 3-wide inclined belts on way to shipping docks. Note floor-storage area (background), which is supplied by conveyor switchout sections.

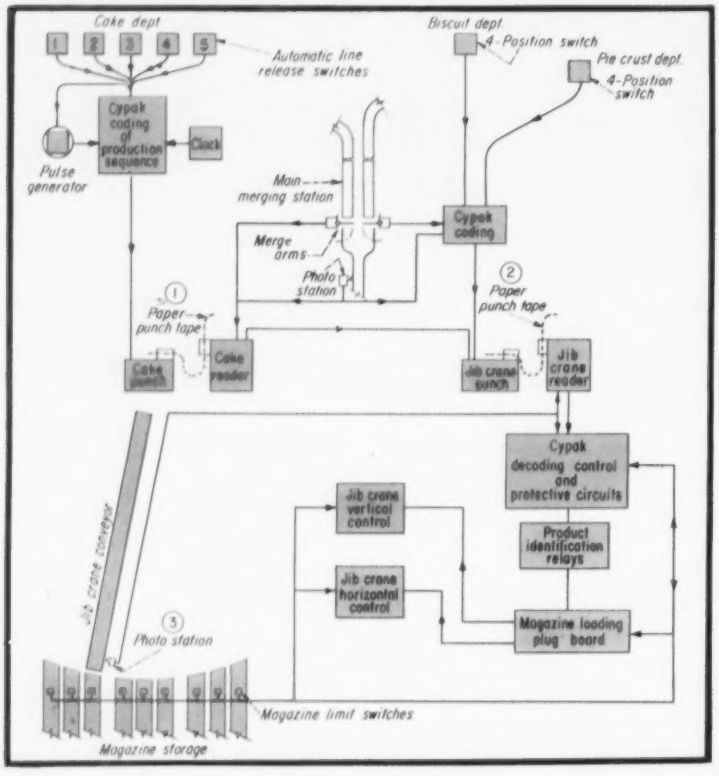


SWING-BELT (3-leaf, 4-high) is terminal case handler. It switches cartons from any conveyor to any of 4 loading docks. Entire handling system is interlocked to assure safety and curb case damage.

Next, a converging gravity section atop each inclined belt channels cartons into a single line, then onto one leaf of a 3-leaf, 4-high swing belt. Each leaf handles one magazine, the 4-high decks permitting carton flow from any magazine to any loading dock.

Discharge of cases from magazine storage to shipping dock is manually directed according to orders to be filled. An intercom system between loading docks and conveyor-discharge stations facilitates delivery of goods in required sequence. And conveyor switch-out sections permit easy shunting of cases not scheduled for immediate shipment to "on-floor stacks."

Thus, cases are delivered from the three premix departments—without any manual handling—to a 2-door loading dock that serves 5 trucks, or to a 3-door dock handling 6 boxcars on 2 spur tracks.



Electronics of new system, showing—

A-B-C's of Chelsea's Case Handling

How the new controls mastermind the flow of cases from packaging line to shipping dock may be seen on the above schematic.

Starting in cake department (upper left), release of a group of cartons triggers a special generator. It feeds pulses into cake-department control panel, where static elements initiate punching of paper tape—Point (1).

Code punched on tape is determined by setting of panel's product plug-board. Five channels of an 8-channel punch transmit these data. Example of tape code punching follow:

Corn muffin	O O O O X
White cake	O O O X X
Yellow cake	O O X O X
Chocolate cake	O O X X X
Spice cake	O X O O X

—where "X" represents a punched hole in the tape and "O" the absence of a hole.

Number of product units relates to number of code signals sent from pulse generator.

Latter consists of 2 proximity elements mounted adjacent to a continually rotating aluminum disk, on which small cast-iron slugs are spaced. Three such slugs are used to represent three piggy-backed case units, and a separate slug is employed to start and stop the pulses.

On receiving a signal from a given packaging line, the static control circuit sets up a memory circuit which, however, is not activated until the start-stop slug rotates to a position opposite its proximity element. After a single turn of the disk, the start-stop slug turns off the memory circuit to avoid further pulse generation.

Next, as cases discharge from the main merging station (top center), they interrupt a photocell beam that indexes the cake-department reader. "Read" codes are then transferred to the jib-crane punch and reader set (2). Paper-tape punch and reader equipment are made by Commercial Controls Corp., Rochester, N. Y.

As for biscuit and pie-crust mixes (upper right), their merged flow activates the jib-crane punch directly by means of photo-detection cells at the merging station. Code is set by two 4-position selector switchs, according to size of carton passing the photo station.

As a result of these actions, the jib-crane tape records the identity and sequence of all cartons coming from the main merging station, regardless of where they originate.

Next control point is the crane photo-detector station (3), at the tip of the boom. Cases passing this point index the crane tape to the "read" position.

Information is then fed into a decoding panel to establish product identity. This circuit energizes a corresponding product relay, which puts voltage on the product cord in a dispatch board. This action, in turn, causes two sets of automatic elevators to "call" the crane to the selected magazine position.

If the crane is properly located for the call, its belt continues to run, projecting cases into the desired magazine conveyor. If not, the belt stops while the crane re-positions itself, then starts up automatically.

As a carton enters a given magazine conveyor, it trips a limit switch that activates a time-delay unit in the control panel. Should latter be "timed out", an "all-filled conveyor" relay in the jib-crane plug board transfers all subsequent elevator-control calls to a next-choice location, as predetermined by jack-to-jack jumper cords.

Total time required for indexing the tape, decoding, and signalling the duplex set of elevators is less than ½ sec. At a belt speed of 100 fpm, this corresponds to about a 10-in. carton travel in the ½-sec. interval.

Crane stops cartons very near boom-end, thus gaining maximum handling potential.

FE makes particular acknowledgment to Bosch & LaTour, Cincinnati, for its cooperation in supplying background material for the above article.

MODERN vacuum and gas-packing technique at Vita Foods opens new markets for this astute firm. Replaced is . . .

CONVENTIONAL bulk distribution of smoked fish, which limits product to delicatessen outlets and appetizer counters.

FILM PACKAGE—

Opens Big Market for Age-Old Products

Leading smoked fish producer switches from bulk distribution to modern plastic pouch to broaden his retailing range

FE STAFF

ONE OF THE LAST vestiges of a bygone marketing method—bulk distribution of retail products—will disappear with the decision of Vita Foods Corp. to pack its line of smoked and kippered fish in modern plastic packages.

The reason is simple. Vita Foods, a leader in its field with annual sales approaching $15,000,000, wants to grow. And company officials feel that the only course is to broaden the market—now mostly concentrated in delicatessens and specialty outlets—to include the chain stores.

With this fact established, the need for a better package is instantly apparent. For the pre-cooked cured fish require refrigerated display space. And the unwrapped products could be a real menace in standard dairy or meat cases—tainting the other foods with their odors.

Also, mass distribution in self-service outlets virtually demands a branded product, and hence an eye-catching package.

The company launched experimental packs in early '56, market testing them in four cities—New York, Philadelphia, Washington, D. C., and Chicago. Consumer reaction was very good. But the original film bags, formed from a cellophane-polyethylene laminate, needed modification to cut moisture-vapor transmission and boost color retention.

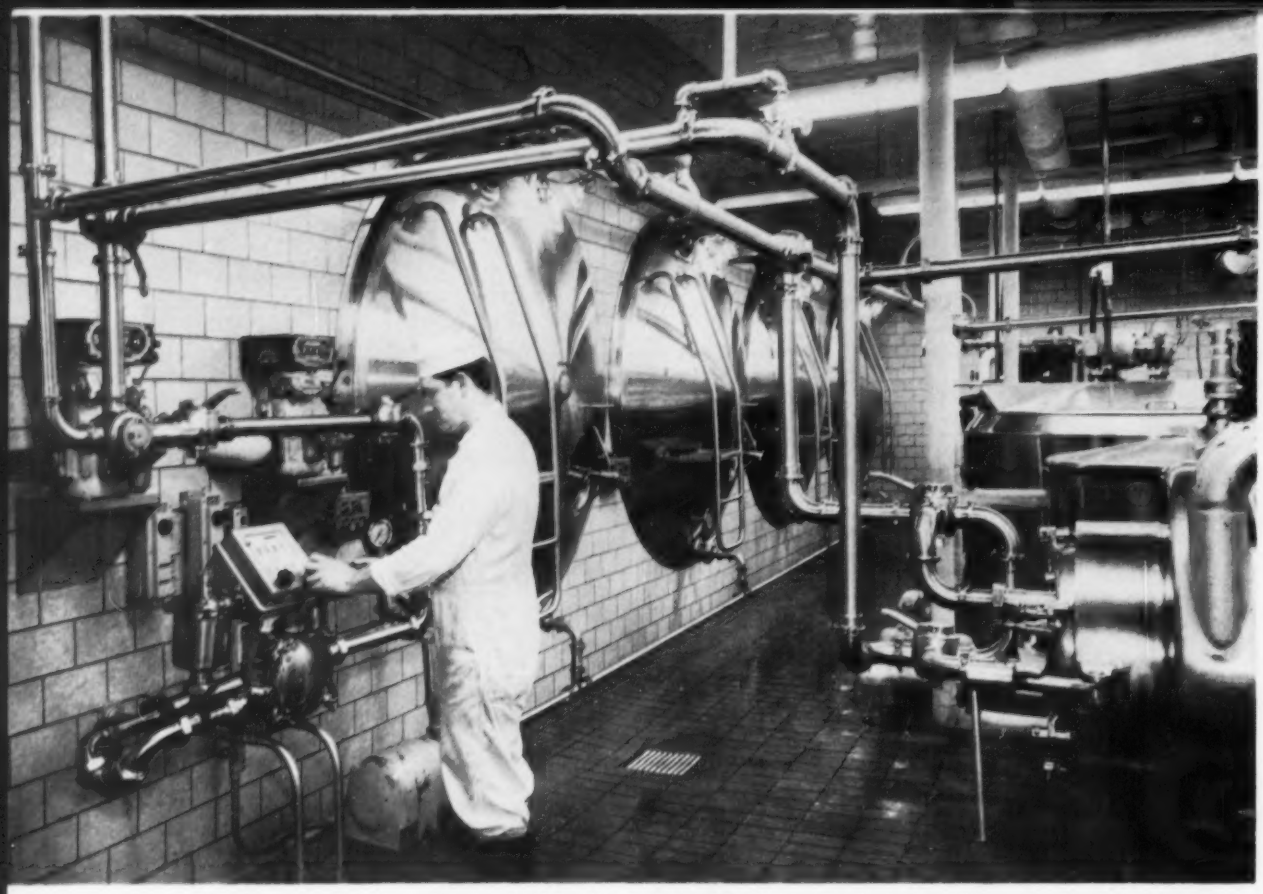
The final result, just introduced this past month, is a pouch made of laminated Mylar, Saran, and polyethylene (Standard Packaging Corp.). Three bag sizes, ranging from 5¼x7¾ in. to 6x10 in., incorporate the entire, seven-product line (lox, kippered salmon and sable fish, and smoked eels, white fish, and whiting).

A nitrogen gas pack is used for the sliced salmon, lox, and whitefish to prevent pieces of these products from sticking together. Vac packaging is applied to the other products to protect the cured flavor.

Pouches are reverse printed (on the Mylar) by a flexographic process. The Vita Foods identification on all packages is in red, while a wave pattern of gold, red, yellow, orange, white, and light and dark blue are used to color-code the various products.

Recipes and serving suggestions are carried on the backs of the packages to help familiarize new customers with the dinner-table and party possibilities of the products. A campaign has been launched to promote the new endeavor.

Packaging is being conducted at the company's Brooklyn, N. Y., plant on a new, 36-pouch-per-min. line that incorporates a twin-head gas-vacuum packer (Standard Packaging). The pouches are loaded in 5- and 10-lb. protective cartons, which are in turn cased in a shipper—*End.*



TYPICAL of part played by flowmeters in the dairy field is their use in ice cream mix-making. Shown here is mixing department in new Borden, Columbus, Ohio plant where all liquid ingredients are metered to processing.

New Sanitary Flowmeters Bring Automation Nearer

Rapid, accurate measurement of liquid flow is now possible through use of recently developed instruments. One type is already widely accepted. Others offer alternate solutions

JACK MEYER

Technical Editor, McGraw-Hill Pacific Coast News Bureau, Los Angeles

A MOST IMPORTANT breakthrough toward continuous, automatic production in the food industry is the recent advent of rigidly sanitary flowmeters.

Coupled and interlocked with scale- and counter-feeders, metering pumps, continuous mixers, blenders, cookers, coolers, and packaging machines, they can provide highly uniform programmed production based on daily or weekly sales requirements.

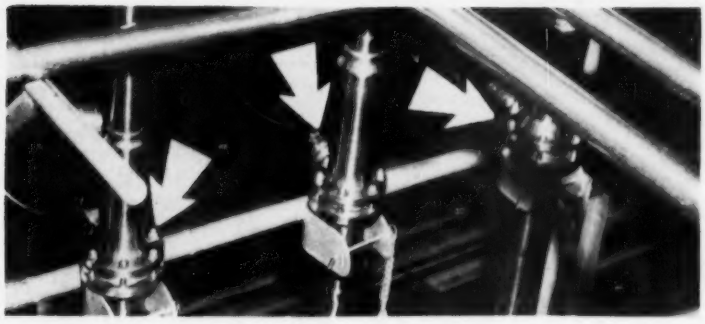
And they can assure subsequent cuts in finished-products inventory, materials handling costs, cold storage needs, and deterioration of raw and manufactured products.

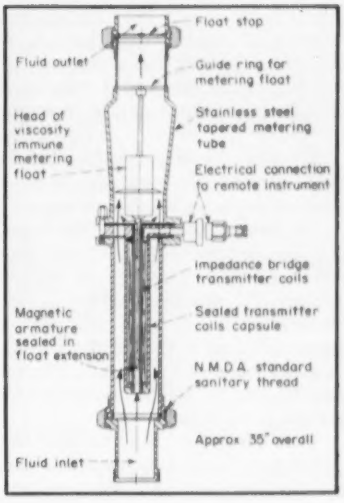
Until recently, however, these advantages and economies have been out of the reach of many food processors.

This problem has been particularly acute in the dairy field, where need for rapid handling of products greatly increases desirability of a continuous-flow device. Here, an acceptable design must meet stringent sanitary standards in addition to providing a high degree of accuracy.

Sanitation Features Paramount

Most obvious specification for a food-material flowmeter—that it be sanitary—requires a drastic deviation




Float stop
Fluid outlet
Guide ring for metering float
Head of viscosity immune metering float
Stainless steel tapered metering tube
Electrical connection to remote instrument
Impedance bridge transmitter coils
Magnetic armature sealed in float extension
Sealed transmitter coils capsule
N.M.D.A. standard sanitary thread
Approx. 35" overall
Fluid inlet

IN SANITARY ROTAMETER, area between float and tapered stainless tube is varied according to flow of liquid. Position of float is electrically transmitted to indicator, recorder, rate or ratio controller where it is integrated for total. (Maker: Fischer & Porter, Hatboro, Pa.)

from usual instrument-industry practices.

All surfaces in contact with the product must be smoothly polished stainless steel, or other specially selected materials. All internal corners must be radius-machined to at least ⅛ in. and be clear of joints or crevices that might hold food particles or bacteria.

Surfaces must be open enough for brushing and thorough inspection, with no "blind" holes or bends sharper than 90 deg. Use of special brushes or special cleaning techniques is discouraged.

The unit must be designed to permit complete disassembly for cleaning by relatively unskilled personnel. It should be built in such a manner as to render incorrect reassembly impossible, or at least produce no output signal unless properly assembled.

And the entire cleaning operation should be easy enough, fast enough, and safe enough so that it does not inspire "short cuts".

With these requirements met, consideration may be given to the meter's ability to deliver information having the required accuracy. Minimum accepted requirement—½ of 1% of actual reading (*not* of full-scale)—must be available over the entire anticipated range of operation and on a total quantity, rather than rate-of-flow, basis for bulk receiving and transfer applications.

Several other features are very highly desirable in the meter system. These are:

1. Fast, easy, and fool-proof installation, along with portability.
2. Pressure drop through the meter low enough to allow rapid product transfer with existing pumps or (in some cases) gravity flow.
3. Built-in protection against plant moisture conditions.
4. Direct and legible readings.
5. Full metering signals and controls.

Various Metering Devices Evaluated

Flow-rate meters are applicable to certain types of processing operations. However, converting from rate to total requires use of an integrating device.

This multiplies rate by time, usually through mechanical or electromechanical means, and can be expected to add an error of at least ½%, even under the best of conditions. This error may be increased by dust, dirt, failure to check calibration frequently enough, or fluctuating flow rates.

Differential flowmeters, used for measuring the flow of steam, gases, and the like, are inherently unsuitable for sanitary use.

Requiring special sanitary seals, these units read flow rate on a square-foot scale, and probably could not deliver even 1% of full-scale accuracy on a flow rate basis without the added integration errors.

Rotameters, or variable area meters, measure flow as a function of the movement of a plug within a tapered tube. The term 'area meter' is derived from the fact that the plug movement varies the cross-sectional area of the tube according to the flow rate.

These units have been employed in sanitary form in dairies and have been applied to proportioning of ingredients in continuous ice cream mix production.

Sonic flowmeters, which detect the difference in velocity between a sound wave traveling upstream and one traveling downstream, have been suggested for dairy flow measurement. Most obvious advantage is that they place no obstruction in the pipeline. Further, they do not produce a pressure drop, or a cleaning problem.

At present, however, system accuracy is between 1 and 2% of full-scale, and the electronic readout equipment is somewhat complex. Also, this meter is inherently a flow-rate device, so that the usual error would be added in obtaining a reading of total flow.

Electromagnetic flowmeters offer some of the same advantages as sonic units, but have similar disadvantages. They measure a very small emf. (voltage), which is a function of flow of liquid between two electrodes mounted in the line.

Although output from the electrodes is directly proportional to flow rate, conversion of the information to flow total involves some error.

For rate measuring applications, such as control of feed or discharge rates in continuous processing, this unit will undoubtedly find use because it has many of the properties of the *ideal* flowmeter—no obstruction to flow, no pressure drop, no moving parts in the flow stream, and others.

Turbine type flowmeters satisfy many of the performance require-

ments for dairy use and can be constructed to permit disassembly for cleaning. Only moving part is a multi-bladed rotor that is centered in the flow stream so that it spins at a rate directly proportional to the rate of flow.

Through electromagnetic induction, each rotation generates a fixed number of a.c. pulses in a pickup coil mounted on the exterior of the housing adjacent to the rotor. An electronic counter (accurate to within ±1 count in the indicated total) will, therefore, indicate total flow with a precision equal to that of the sensing element itself. This enables the system error to be held to less than ½% for many applications.

Through proper rotor design, the pulses-to-volume ratio can be fixed at unity, or held as a decimal ratio (such as 1 pulse per lb. at a fixed density, or 10 per gal.) to give a direct reading. Instrumentation available includes various types of indicating and predetermining totalizers, and flow rate indicating, recording, and controlling systems.

Despite the advantages of light weight, simplicity of installation, accuracy, and sanitary acceptability, adoption of the turbine type unit has been limited by application difficulties.

As is true of all volumetric meters, the unit registers entrapped air or foam as a part of the indicated total.

Also, there is a loss of accuracy in handling liquids having viscosities over 10 centipoises—a range that excludes cream, ice cream mix, and a number of other food products.

Cleaning presents two problems: First, there is need for extremely careful handling of the rotor to avoid bending or damaging of its small blades. Second, presence of a few small holes requires use of pipe cleaners or special brushes.

The instrumentation demands careful planning—to steer clear of false indication due to the presence of stray magnetic fields and to avoid damage due to water or moisture.

Positive displacement meters. One such unit (Siemens, made in West Germany) is already in wide use in Europe, and there are now more than 150 installations in this country.

This is similar to units employed for metered deliveries by oil tank trucks. And as a result of this experience, it incorporates safety features that make it virtually impossible to record an inaccurate reading.

The meter is being employed for a wide variety of dairy products, ranging from skim milk to superheated condensed and heavy cream. Some companies in the beverage, baking, and coffee extract fields are also using it to good advantage.

How It Operates

This meter reverses the function of a positive displacement pump, converting movement of a fixed quantity of fluid through the line into a definite number of rotations of an output shaft. Use of a magnetic coupling to transmit this motion through the stainless steel wall of the meter body eliminates any need for seals or stuffing boxes to achieve a completely sanitary design.

High accuracy over a wide range is made possible by lack of friction, and direct operation of a counter or indicator provides a simple, error-free readout.

The meter is completely self-contained, requires no power supply, and has been approved for use in the dairy field by sanitarians throughout the country.

Essentially, the unit consists of a shallow cylindrical chamber containing an eccentric rotary piston, a magnetic coupling, and a counting device. The chamber also has a small concentrically mounted cylinder with a partition fitted between the inner chamber wall and the outer cylinder wall. This separates the inlet port from the outlet port and establishes the direction that flow must take.

The thin-walled rotary piston is mounted within the chamber so that its outer wall is always in contact with the inner wall of the chamber and so that its inner wall is always in contact with the concentric cylinder. Thus, the piston is always subjected to high pressure against one of its walls from the inlet side of the meter. Its central point describes a circle concentric to the chamber wall as the piston moves in a direction that tends to equalize the difference between inlet and outlet pressures.

A pin connects the center of the piston to a stainless steel, freely rotating disk at the rear of the unit. And a permanent magnet, sealed within the disk, couples through the rear wall of the housing to the counter drive shaft.

A number of operating advantages are derived: The large effective area over which pressure is applied makes the meter highly sensitive, permitting operation from gravity-feed or low-pressure pumps. The same unit can be used for fluids having a wide range of viscosities with no loss of

TESTS DEMONSTRATE ACCURACY OF SIEMENS METERS

Water in Miscellaneous 100-Gal. Batches, Continuous Runs*

Flow (Gpm.)	Pressure (Psi.)	Temperature (Deg. F.)	Error (Pints)	Error (Percent)
74	7.5	50	−1.0	0.13
74	7.0	38	0	....
74	7.5	39	−0.5	0.6
74	7.5	38	+0.75	0.1
74	7.5	36	0	....
74	7.5	36	0	....
74	7.5	38	−0.5	0.06
74	7.5	38	0	....
74	7.5	38	0	....
33	14	43	−0.75	0.1
33	14	41	−0.25	0.03
33	14	57	−1.0	0.13

Milk in 10-Gal. Batches, Using Air Eliminator*

Flow (Gpm.)	Pressure (Psi.)	Temperature (Deg. F.)	Error (Pints)	Error (Percent
74	7.5	49	−0.5	.06
32	4.5	49	+0.75	.1
52	3.5	52	+1.0*	.13
67	5.0	50	−0.25	.03
86	8.0	50	−0.5	.06

*Samples used in above tests were relatively small, with correspondingly short run times. "Scatter" of readings under these conditions may be due to "start-stop" errors as well as actual meter error.

accuracy. The wiping action of the piston prevents build-up of material within the meter chamber.

This meter is available with a wide variety of totalizing units. If sufficient demand existed, instrumentation could also be provided for rate-of-flow measurement and control.

The dial-type register (8-in. dia) has an outer scale graduated to 10 gal. (readable to the nearest 1/40th gal.) and an inner one graduated to 200 gal. A roller-type totalizer at the center accumulates total flow through the meter, while the hands of the dial can be reset to zero between batches.

This type of indicator has considerable versatility because of the high readability of the clock-type hands. The regular progress of the outer (10-gal.) hand permits anticipation of the "stop" point when operating a manual control valve to measure out batches, or when using a stopwatch for precise measurement of flow rate in calibrating pumps or other equipment.

Standard registers have numerals about ¾ in. high and totalize flows up to 9999.9 gal. with lever-operated reset to zero. A smaller register, separately reset, accumulates total flow on a seven-digit counter.

Roller-type counters, with large easily-read numerals, are preferred by many users for milk handling jobs where timing or exact shutoff at a specified point are not needed, since they can be read faster and with less chance of error.

A print-out unit can easily be added to this counter to provide a record, in triplicate, of the total measured in each operation.

Tank-truck use has established the ability of this mechanism to stand up under rough usage, resulting in a degree of familiarity that favors farmer-acceptance of the meter as a basis for payment. The entire unit can easily be mounted on trucks used for bulk farm pickup, since it is self-contained and requires no power for operation.

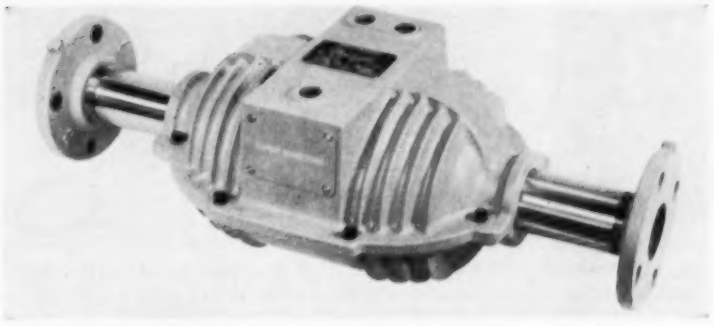
Automatic quantity measurement is readily obtained through use of a preset counter that mounts in place of the conventional register. This unit has two registers—one subtractive unit, which is manually set at the quantity to be metered, and an additive unit, for indicating the amount that has passed through the unit.

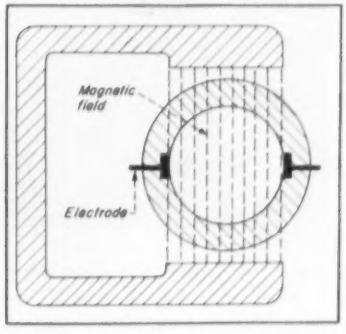
An automatic control valve of sanitary designs is supplied as a part of the batch-control system. After setting the quantity to be metered, the operator lifts the "Start" lever on the control valve. Upper register of the unit then indicates total flow in gallons, while lower one indicates number of gallons remaining to complete the batch.

When preset total is almost reached, the control valve gradually moves to a ¾-closed position, then closes completely and instantly when the lower counter reaches zero. This system allows most of the operation to proceed at maximum flow and, by

These Units Measure Sound and Voltage

NO OBSTRUCTION to flow is produced by sonic flowmeter which compares upstream and downstream speed of sound to measure rate. Totalizer requires integration of flow rate. (Maker: Fischer & Porter.)





IN MAGNETIC METER, flow rate is measured as function of voltage change in electrodes inserted in pipe wall. Signal is amplified and measured by recorder or controller, then integrated for total. Unit is non-viscosity sensitive. (Maker: The Foxboro Co., Foxboro, Mass.)

throttling near the end-point, prevents overshoot. The same quantity can be repeated by moving a lever to reset the lower register to its original reading and lifting the "Start" knob.

Also included is a built-in "overrun control" feature—an emergency stop button for manual closure of the control valve. Further, there is a new accessory that enables the meter to turn off a pump and summon the operator when a complete batch is delivered.

2 Problems Hobble Utilization

There seem to be only two major problems tending to slow down the widespread adoption and utilization of sanitary flowmeters in the food industry. One is primarily psychological, the other mostly physical.

The psychological problem concerns recognition and acceptance of the unit as a proved answer to fluid measuring and comparison on a performance basis with other methods and equipment.

True, meters are expensive on a price-per-pound basis. However, if a comparison is to include such factors as floor-space requirements, versatility, ease and rapidity of cleaning, low maintenance features, installation costs, or improved operation through suitability for continuous processing, it will be evident that a good flowmeter begins to return a profit the moment it is put in the line.

In such varied operations as verifying inter-plant transfer figures, automatic ice cream mix production, checking filler losses, and programming the milk supply to different plant operations, they have brought a new dimension to cost analysis and production control.

Air Poses Big Problem

The physical problem is one that can be solved by either short-range corrections or by long-range improvements. It arises from the unfortunate fact that dairy flowmeters have been non-existent—and so there has been no development of milk handling equipment and methods that are conducive to measuring with reasonable accuracy.

Air that is sucked, blown, beaten, or otherwise incorporated into milk and dairy products during normal handling is measured by any volumetric flowmeter.

Since no sanitary, continuous meter for indicating weight, rather than volume, is likely to be available within the next few years, the only practical solution is to eliminate the air before it has a chance to enter the meter.

The Siemens meter solves this problem through the use of a simple air eliminator in the line, obtaining excellent results at the expense of an extra piece of equipment. This system's readings are within the ½% guaranteed accuracy in most cases, with some installations delivering the 1/10% usually anticipated only under ideal conditions.

However, elimination of this problem at its source is preferable, both as a means of maintaining high accuracy and to eliminate the need for extra equipment.

A few obvious design changes would permit development of such systems featuring air-free operation. And the changes in question would add little or nothing to the cost of storage tanks, trucks, or other equipment.

Firms Making Them

The following companies manufacture the meters described in this article:

Fischer & Porter Co., Hatboro, Pa.: Sanitary rotameters, sonic, and turbine flowmeters.

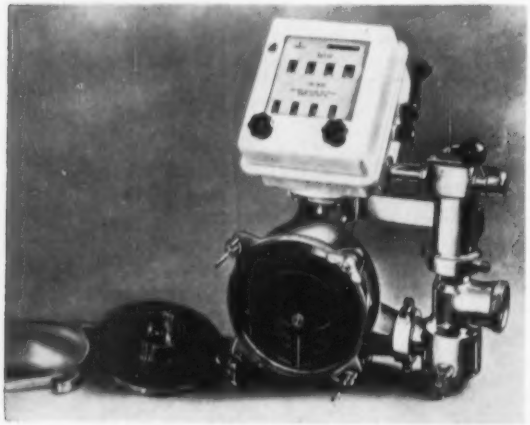
The Foxboro Co., Foxboro, Mass.: Electro-magnetic flowmeters.

Potter Aeronautical Corp., Union, N. J.: Turbine flowmeters.

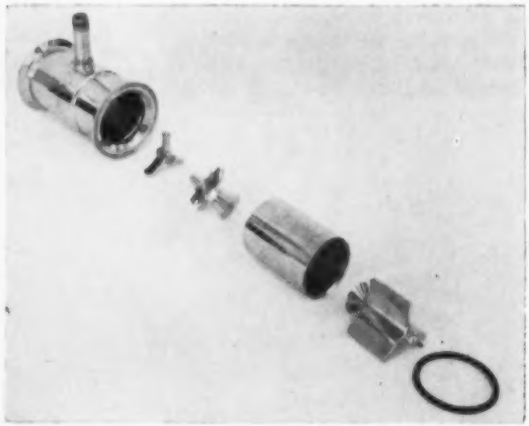
Siemens & Halske Aktiengesellschaft, Karlsruhe, Germany: Positive displacement meter. (Imported and distributed in U. S. by *T.E.A., Inc.*, Flushing, N. Y. Also distributed by *Chicago Stainless Equipment Co.*, Chicago.)

Waugh Engineering Co., Van Nuys, Calif.: Turbine flowmeters.

These Meters Make Use of Liquid Impelled Members



POSITIVE DISPLACEMENT METER uses rotary piston, with magnetic linkage through stainless steel wall to transmit its motion to meter body. Totalizer is direct driven. Unit provides automatic shutoff at end of preset batch. Operates over wide viscosity range. (Maker: Siemens & Halske, Karlsruhe, Germany.)



TURBINE TYPE METER develops signal by direct rotation of multi-bladed rotor centered in flow stream. Through electromagnetic induction, each rotation generates fixed number of a.c. pulses in a pickup coil mounted on exterior of housing. Electronic counter indicates total flow. (Maker: Potter Aeronautical Corp., Union, N. J.)

BELT-TROUGH DRYERS
Now in Action on Plant Line

Continuous units turn out more uniform vegetable or fruit products. Partially dried materials are sped directly to dehydro-freezing or are routed for further drying

HERE'S A STRIKING CASE of directly "tracking" a top research development into an advanced commercial-production project. In short—the battery of six belt-trough dryers now turning out market quantities of dried vegetables at California Vegetable Concentrates, Inc., Modesto, Calif.

The initial creative work was carried out by experts at Western Utilization Research & Development Div., USDA, Albany, Calif. Their prototype design of the vegetable and fruit drying unit won immediate attention (FE July '55, p. 43).

Teamwork with the staff of C.V.C. followed, and the first plant-size dryer was built. Checks and modifications proceeded. Then the machine was confirmed in more than a year of successful operation. The time from prototype to perfection of the commercial unit was less than 18 months.

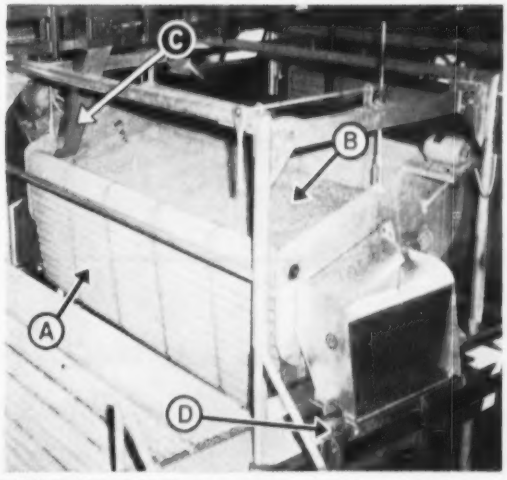
In C.V.C.'s six-machine installation, vegetables are conveyed from blanchers, dried to less than half their original weight, and belt-sped either to freezers or further drying. Specifically, four of the units are being used for partial drying of product prior to dehydro-freezing or subsequent additional drying.

Evaporative capacity of each unit is 650 lb. water per hr. This was the result with carrots (cut $\frac{3}{8}$x$\frac{3}{8}$x$\frac{3}{16}$ in.) and other vegetables ($\frac{3}{8}$-in. cubes) when drying with air at 275F. Thus, when drying to half input weight, 1,300 lb./hr. of raw product can be charged into the dryer. Capacity for a 65% reduction would, of course, be less.

In these units, lateral slope of the trough is adjusted to the natural angle assumed by the product. This results in a uniform bed depth. For most products diced $\frac{1}{4}$ to $\frac{3}{4}$ in., the angle is about 18 deg. Butterfly dampers adjust air flow to dryer. Thus, product-bed movement and distribution are varied as necessary for optimum action.

New Belt Stops Losses

The salient modification in the equipment is the new conveyor belt, specifically developed for the unit by Cyclone Fence Dept., U.S. Steel Corp.* This belt virtually eliminates losses through the mesh—an important factor with small pieces.



IMPROVED UNIT does away with sheet metal enclosure, elbow air entry, and large exhaust duct. Special new trough belt (A) stops seepage of smaller product pieces (B). Input (C) from blanchers and take-off (D) to freezers are by belt for continuous operation.

Primarily, the belt consists of 6 strands of $\frac{1}{2}$-in. stainless steel roller chains. These are equally spaced and securely attached to the underside of a tightly woven, 10-ft.-wide, stainless belt by means of special spirals and extension pins. The belt is endless and "seamless" both longitudinally and laterally. A "quick opening" connection permits cleaning below the belt.

New features of the air heating-and-circulating system include an 'egg-crate' straightener at the fan discharge, turning vanes in the drier plenum, and a straight transition section between fan and drier in place of an elbow-type connection. The changes increased the quantity and improved distribution of air delivered to the dryer.

WURDD experts prominent in carrying out the work were E. Lowe, E. L. Durkee, and W. E. Hamilton, while active for C.V.C. was R. L. Hughes.

Plans for this latest dryer are available from Western Utilization Research & Development Div., USDA, 800 Buchanan St., Albany, Calif. —*End*

*Mention of specific equipment does not imply USDA endorsement over other units of a similar nature.—*The Editors.*

Show Reflects Rising Fancy Food

Take a look at 36 of the hot packages and products displayed at the 3rd Annual Fancy Food and Confection Show

"EVERYTHING from chocolate-covered ants to pickled whale skin" —that was the boast of the Third Annual Fancy Food and Confection Show, held in New York City recently. But far in excess of such gourmet foods as fried grasshoppers were the hot new product and package ideas on display.

Since its beginning in 1955, the show has grown by 70%. Its sponsor, the National Association for the Specialty Food Trade, regards the growth as an indication of the increasing importance of specialty foods, whose sales now total $60 million a year.

Members of the NASFT attribute climbing sales to the fact that American families are doing more entertaining at home, and to the palates developed by travel abroad.

As evidence of the potential in fancy foods, General Foods has now joined the smaller companies (Sept. FE p. 74). The small businesses look with favor on the decision because they feel that the corporation's advertising of gourmet foods will benefit everyone by spurring consumer interest.

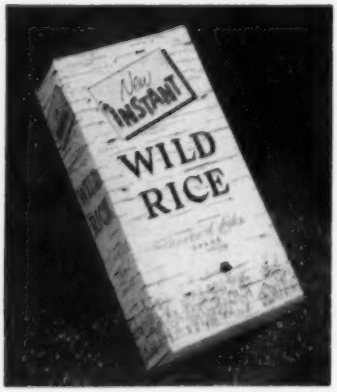
Several trends were noted among exhibitors at the show:

▶ Impatience with the high reliance on re-use containers caused some to complain that they were "selling the package, not the product." Several announced their intention to drop elaborate containers and concentrate on attractive but in-

Imaginative Products Make Debut

WINE GELATIN desserts are made in Madeira, port, and sherry. Made of wine, sugar, gelatin, and U.S. certified color, the product is made in cake form to preserve wine flavor.—*J. Lyons & Co., Buffalo.*

COCKTAIL delicacies include tiny, whole pickled beets, pineapple sticks in sugar syrup, cherry-pineapple sticks, and Pennsylvania Dutch corn relish.—*Melba Food Specialties, New York City.*



INSTANT WILD RICE makes four servings or enough to stuff a medium-sized fowl. The 2¾ oz. carton is mixed with boiling water, let stand, then drained to prepare.—*Roth & Liebmann, New York City.*

EUPHRATES BREAD wafers are made of wheat and whole wheat flour, roasted sesame seeds. Large wafers are packed eight to a carton. Waferettes are 28 to an overwrapped carton.—*Melba Food Specialties, New York City.*

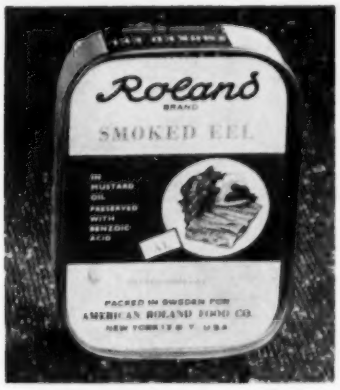
CHEESE PATE is newest product of Romanoff Caviar Co. Ingredients are Neufchatel cheese, yeast, salt, hydrolyzed plant protein, MSG. Jars are made in 2-, 4-, 8-oz. sizes.—*Romanoff Caviar Co., New York City.*

Demand

expensive packages. The problem is reminiscent of the recent holiday decanter problem among distillers.

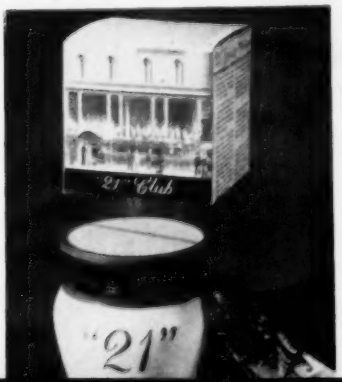
► Some imported products are being rejected because of dull, unimaginative labels. Dealers are insisting on bright, attractive labels capable of competing in the American market. Some dealers even supply American-designed and printed labels to overseas firms.

► The importance of packaging in selling foods largely dependent upon impulse sales is accepted more than ever. With the fancy foods moving onto open shelves in grocery stores, the package must meet the challenge of sharp packaging ideas.



CANNED EELS smoked, packed in mustard oil, and preserved with benzoic acid. The 4-oz. sardine-type can is packed in Sweden under the Roland label.—*Bruno Scheidt, Inc., New York City.*

WHITE CROCK with red plastic seal holds "21 Sauce Maison," named after the famed restaurant.—*Iron Gate Products Co., New York City.*



Spices in Fancy Dress

TAMPERPROOF SEALS for apothecary jars used for spices (left to right): Paper seal (left) is positioned when stopper is inserted, prevents sifting, contamination (*Twin Trees Gardens, Inc., Lynbrook, N. Y.*); Plastic overwrapped stopper and neck keeps stopper in place, seals contents in *Spice Islands, San Francisco.*

SPICE RACK holds 12 glass apothecary jars. A polyethylene liner on glass stopper provides a tight seal.—*John Wagner & Sons, Hatboro, Pa.*

GARLIC CHIPS in jar share sectioned carton with mill.—*Spice Island Co., San Francisco.*

MUSHROOM POWDER is packed in cylindrical jar with polyethylene sifter fitment.—*Twin Trees Gardens, Lynbrook, N. Y.*

SPICE CHEST holds eight 1½-oz. glass-stopped attractive apothecary jars in individual compartments. Handy spice chart is inside cover of the brass-bound box.—*Twin Trees Gardens, Lynbrook, N. Y.*

Announcing...

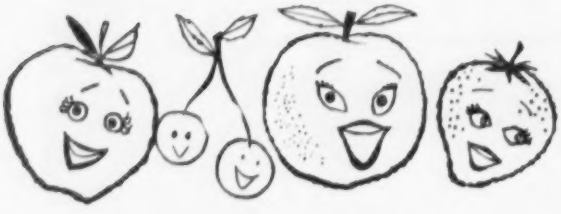
MERCATE "20"

(SODIUM ISOASCORBATE, MERCK)

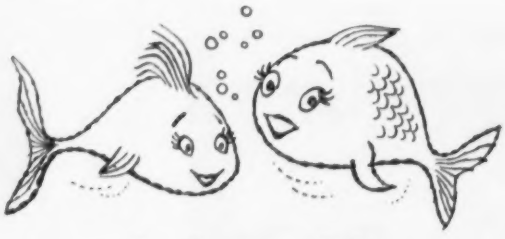
MERCATE "5"

(ISOASCORBIC ACID, MERCK)

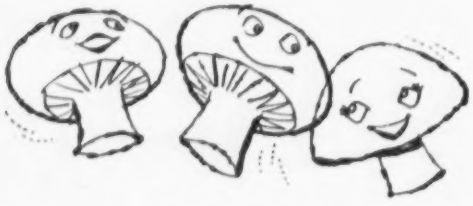
Lower Cost Antioxidants to Preserve Natural Color and Flavor



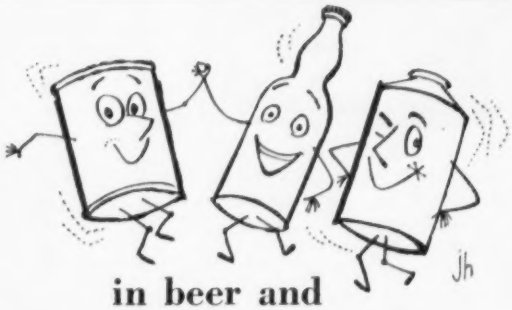
in frozen fruit



in frozen fish



in processed mushrooms



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MERCATE "20" and MERCATE "5"—the new stereo isomers of sodium ascorbate and ascorbic acid—offer you the full antioxidant effectiveness of the older ascorbates *at a substantial savings in cost*. Use either product to increase shelf life and boost consumer acceptance for a variety of nonfat foods and beverages. You can count on MERCATE "20" or MERCATE "5" to minimize the development of undesirable color, flavor and odor, and to reduce container corrosion.

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Emphasis on Packaging

SCULPTURED POLYETHYLENE is the package for fruit juices and seasonings. Shown above are lemons in 1-, 2¾- and 15-oz. sizes, holding concentrated natural juice. U.S. Certified color is added to the 5-oz. orange. The smaller lime holds concentrated juice of 8 fruit. The flexible garlic bulb and tomato spray dry seasoning.—*Martin J. Berman, New York City.*

"KOBU NUTS" are a sandwich of peanut halves and paste, secured with a strip of Kobe leaf. Attractive can cover and carton are made of laminated wood and paper. —*Perry Chipurnoi, New York City.*

FORTUNE COOKIES are placed in cellophane bag, then in glass jar. Each jar holds 20-22 cakes.—*Melba Food Specialties, New York City.*

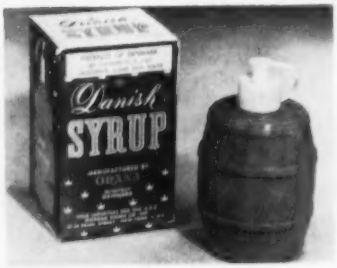
MISLEADING package holds 12 oz. of maple syrup. Screw cap is sealed on by simulated tax stamp. —*American Maple Products Co., Newport, Vt.*

STEIN is package for prepared mustard. Plastic-covered cork is seal.—*Melba Food Specialties, New York City.*

CHINA CROCK holds crystallized ginger. Crock is decorated with red, green, or blue chinese scenes.— *J. Lyons & Co., Jersey City.*

MINIATURE jars have 1½ oz. of jam.—*Monte Carlo Foods, New York City.*

FLOUNDER FILLETS from Germany packed in oil, use oval tin with unusual key opener.—*Liberty Import Corp., New York City.*



FLEXIBLE BARREL holds Orana brand sugar syrup. Loop attached to the neck keeps cap handy.—*Murdan Foods, New York City.*

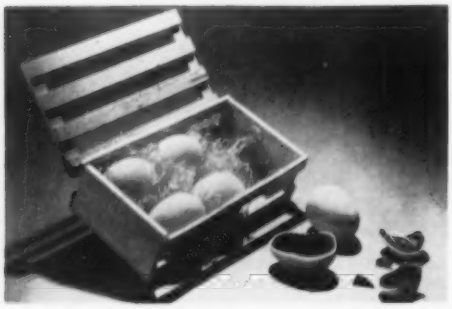
COLLAPSIBLE tube holds anchovy paste in butter.—*American Roland Food Co., New York City.*

PROCESS CHEESE is packed in styrene box or staples wooden carton with cardboard lid. Cheese is made with wine or brandy.—*Roth & Liebmann, New York City.*

ANCHOVY paste is packed in colorful tube.—*Liberty Import Corp., New York City.*

Candy on Display

PARIS KIOSK of wood and heavy cardboard holds 1 lb. of hard candy. Package is 13½ in. high.—*Libert Import Corp., New York City.*



LIFELIKE chocolate eggs coated with sugar are packed in wooden egg crate in Italy. Padded with excelsior, eggs are packed six to crate.—*Gourmet Imports, New York City.*

APPLE of chocolate is segmented for serving. Overwrap is foil.—*H. Hamstra, New York City.*

CIGAR BOXES are novel packages for Danish candy cigars. Thirty boxes are packed to a carton. —*Murdan Foods, New York City.*

New Coffee, Tea Packages

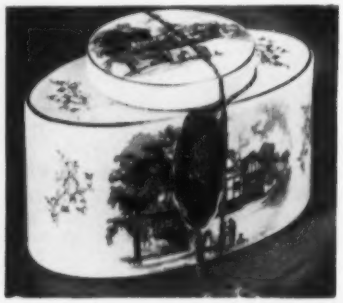
TURKISH instant coffee has sugar and cinnamon added.—*Spice Islands Co., San Francisco.*

2-CUP TEAPOT is re-usable package for 10 teabags wrapped in cellophane. Also included is a booklet of tea-making suggestions.—*R. C. Bigelow, Inc., Norwalk, Conn.*

GOLD FOIL SLEEVE holds five canisters of assorted teas: Formosa Oolong, Jasmine, Darjeeling, Capri, and Constant Comment (tea with orange rind and spices added).—*R. C. Bigelow, Inc., Norwalk, Conn.*

LACQUERED CANISTER has foolproof double closure: cap and inside stopper.—*Spice Islands Co., San Francisco.*

"CUPBOARD" carton holds 20 teabags of 4 varieties. Dutch design adds color, appeal.—*R. C. Bigelow, Inc., San Francisco.*



CHINA CADDY is made of Staffordshire China, holds loose tea or bags. Cord with seal holds lid in place.—*Crawford S. Norris Co., New York City.*

Stop label waste

...with Tickometer imprinting!

A product line with any range of styles, sizes, colors, etc. can run up a lot of labels—stealing a lot of stockroom space. Even the slightest product change makes labels as dead as autumn leaves, fit only for burning. If label wastage is one of your worries, you'll be glad to learn how the Tickometer can turn a trick in your label department!

• A lot of companies are limiting their labels stocks to basic forms and sizes . . . and using the Tickometer to imprint special designations—weight, size, color, grade, type, code, date, etc.

• The Tickometer imprints labels *as they are needed*, for the day's production, lot, batch, or special run—at speeds up to 1,000 a *minute*. Result is that label inventories are down, printing costs reduced, and wastage of unusable labels at a minimum.

• The Tickometer has an impression area of $2\frac{3}{16}$ by $\frac{7}{8}$ inches, gives close register, prints on most weights and finishes of paper and light card stock, in sizes ranging from 1 by 2 inches to 15 by 15 inches (according to model size). Feeds and stacks automatically. Counts, too—and is so accurate that banks use it to count currency! Can make a predetermined count, record part or full totals, and has optional consecutive numbering.

• It's versatile in other ways as well . . . is used in plants and offices to mark, stamp, endorse, cancel or code coupons, sales and production slips, checks, cards, tags, tickets, forms, etc. —with big savings in time and effort.

• Can be rented or bought. PB has 302 service points, including 107 branch offices coast to coast. Call the nearest PB office for a demonstration, or send coupon for free illustrated booklet and case studies!

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Putting Electronic 'Brains' to Work

Here's the 'how' of solving complex managerial problems with the amazing tube-and-wire computers. Particularly targeted is the difficult calculating of plant layouts and work scheduling, product line selection, and pricing and promotion

CHARLES E. FRENCH and JAMES C. SNYDER

Respectively, Professor and Instructor, Agricultural Economics Department, Purdue University, Lafayette, Ind.

ANSWERS TO PROBLEMS speed from automatic typer (Flexowriter), which is activated by impulses from "brain" (partially visible in background).

THE "GENERAL PROBLEM" of linear programming is an especially productive tool of the "electronic brain."

In fact, it is the newest, most up-to-date approach to managerial problems involving (A) plant layout and work scheduling, (B) product line selection, and (C) product pricing and promotion.

We have already talked a bit about this.* Now we will go on to learn how to take advantage of this mathematical giant.

Where This Technique Works

As for specific plant problems where linear programming can be used most effectively, our discussion here can include only a few. But you can think of many more.

A—Plant layout, work schedules, and related areas: Here, linear programming will put the finger on losses arising from bottlenecks in plant production operations. For example, you can easily and accurately determine what you can spend for additional machinery and building capacity. Also, the "brain" uses this method for most plant layout problems.

Complex scheduling and loading problems can also be handled. Important examples include: 1. What machines and processes to use, 2. labor scheduling and control, 3. delivery-route scheduling, 4. incentive wages and route commissions, 5. seasonal production plans, and 6. inventory problems.

B—Product Line Selection: Both production and marketing are interwoven in these problems. Plant capacity, changes in production scheduling, market sales potential, and probable action of competitors must be considered. Linear programming allows simultaneous consideration of all of these factors and gives explicit answers.

C—Pricing and Promotional Policies: The techniques show in detail the effects on net profit of variations in sales and prices of each product. This, in turn, allows more accurate budgeting of advertising outlays by products. Also, we get a wealth of guides for pricing individual items. The superiority of linear programming again arises from simultaneous consideration of all alternatives. When an "electronic brain" is used, problem size is not a major factor.

* See the first article of this series—"Electronic 'Brains' for Food Firms?" by Author French, FE Sept. p. 69.

So far this hasn't been true of the human brain.

Basically, we operate with fairly well-known, given production factors. For example, we have machines and storage rooms with given capacities. We have given crews in given departments. Moreover, our market forecasts dictate certain things about our output. Our direct costs and selling prices vary by products.

Even if we are lucky enough to have our finger on all these facts, the conflicting interrelationships among these things are too much for most of our human minds to unscramble.

True, some persons do a better job of this than others. We call them "managers." Yet, an honest manager today will admit that he weighs all of these conflicting patterns in a rather crude way. He is often pleasantly surprised that his answers come out so well.

Getting Problems Ready

Linear programming allows us to put these pieces together one by one through mathematical formulas. Then we can feed the whole thing into an "electronic brain."

Here, the "brain" has no trouble simultaneously giving the proper weight to each item. Then, according to the way *you related the problem to the machine*, it gives you the one best answer.

Let us review a very simple problem in which we know these things:

1. We have these fixed factors:

a) Coldroom space .....52,000 sq. in.
b) Capacity of box machine...360 min.
c) Capacity of carton machine.360 min.

2. It takes this much of each of the above to produce one unit of these products:

	Coldroom Space (Sq. In.)	Box Mach. Time	Carton Mach. Time
a) Box	5	.18 min.	None
b) Large carton	8	None	.04 min.
c) Small carton	2.5	None	.04 min.

3. Our selling prices per unit of all costs, except a charge for the coldroom space and machine time, are:

a) Box .....15c.
b) Large carton .....20c.
c) Small carton .....7½c.

4. We have 10,000 potential customers. One box will meet the needs of 2 customers, or the large carton will satisfy 1 person. It takes 4 of the small cartons to satisfy a customer. It is immaterial to a customer which package he gets.

5. We want to know how many

KEY FIGURES OF SPECIFIC PROBLEMS
(See Text)

TABLE I — Amount of Limiting Items Available

LIMITING ITEMS	TOTAL QUANTITY	INDIRECT REQUIREMENTS	DIRECT AMOUNT AVAILABLE
Plant labor	12,000 hr.	2,000 hr.	10,000 hr.
Storage room	60,000 sq. ft.	5,000 sq. ft.	55,000 sq. ft.
Packaging machine	500 min.	50 min.	450 min.

TABLE II — Inputs of Limiting Items Per Unit of Product

LIMITING ITEMS	PRODUCT A (INPUT/UNIT)	PRODUCT B (INPUT/UNIT)	PRODUCT C (INPUT/UNIT)
Plant labor	2 min.	1 min.	4 min.
Storage room	7 sq. in.	3 sq. in.	5 sq. in.
Packaging machine	3 min.	2 min.	5 min.

TABLE III — Inputs of Unlimited Items Per Unit of Product

DIRECT COST ITEMS	PRODUCT A	PRODUCT B	PRODUCT C
Packaging materials	3c.	1c.	5c.
Raw materials	2c.	3c.	4c.
Total	5c.	4c.	9c.

TABLE IV — Sales Forecasts and Net Selling Price Calculations

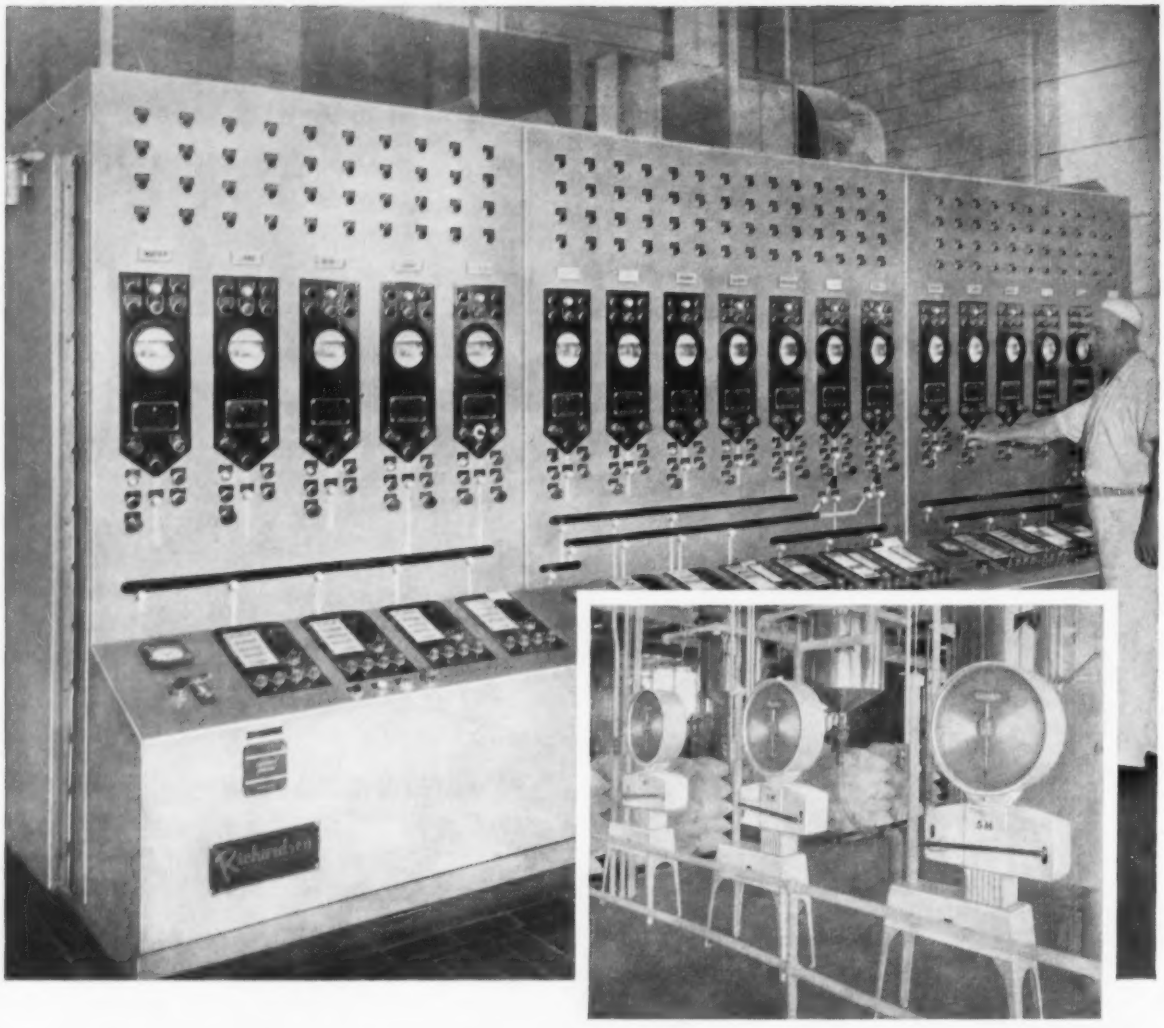
GENERAL PROCEDURE	PRODUCT A	PRODUCT B	PRODUCT C
Step One			
1. We can sell up to this much of these products . .	15,000 units	20,000 units	17,000 units
2. At these per-unit market prices . . .	40c.	30c.	45c.
Step Two			
1. Subtract total direct costs . . .	5c.	4c.	9c.
2. Resulting figure is net selling price . . .	35c.	26c.	36c.

TABLE V — Answers on Product Line as Received From Linear Programming

PRODUCT	BEST PRODUCT LINE	CHANGE IN GROSS RETURNS IF ANOTHER UNIT OF THESE PRODUCTS COULD BE PRODUCED (CENTS)
A	10,000	+ 3
B	None	—10
C	23,500	+ 2
D	44,000	+10
E	None	— 8
F	85,000	+ 4
G	90,000	+ 1

TABLE VI — Answers on Resource Use as Received From Linear Programming

LIMITED ITEMS	UNUSED AMOUNT	INCREASE IN GROSS RETURNS IF WE INCREASE LIMITED ITEMS BY ONE UNIT
Plant labor	3 hr.	None
Storage room	None	$20/sq. ft
Packaging machine	None	$1/min.
Processing machine	2 hr.	None



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...And Adaptable to Any Industry Requiring Precise Formulation

This Richardson Select-O-Weigh system is the most complete automatic proportioning panel yet installed in the food industry.

Coupled with a conveying system, the panel controls automatic feeding of material from any of 14 flour bins, two sugar bins, and storage tanks for shortening, invert, molasses, and water. With this system, the bakery can proportion three different formulas simultaneously. Every phase of operation is clearly indicated on the panel by means of signal lights, which graphically reflect actual material flow. Ingredients can be delivered in the sequence and proportions called for by a specified formula. When each phase of this operation is completed, a signal light on the panel notifies the operator. When an ingredient is delivered to the mixer, a light beside the panel card on the board flashes. The operator knows at all times the progress of each formula being delivered to the mixers.

CONTROLS

The entire Richardson Select-O-Weigh system is interlocked with all elements it controls, so that any operation can be halted if necessary. At the beginning of each weighing cycle a "ready-start" light flashes, indicating the scale is at tare. At the conclusion of each weighing, an automatic weight check is made. Under- or overweight is indicated on the control panel and scale discharge is automatically held up for correction.

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boxes and how many cartons to produce for maximum returns. Also, we want to know how many of these customers we should serve.

We doubt that you can solve this in your head. Further, we can't draw a picture of this one (as we did one of the problems in our first article). This one is too complicated. So, let's see how we would put it in shape for the "electronic brain."

Mathematical formulas are what we feed to the "brain." So let's convert this problem into "brain food."

Let B stand for boxes produced, L stand for large cartons, S for small cartons, and C for coldroom space not used. Then we take care of what we said above about coldroom space with this formula:

$$5B + 8L + 2.5S + C = 52{,}000$$

The following formula is the "brain's" idea of our use of the box machine, provided we let it call the unused time on this machine, M_b:

$$.18B + M_b = 360$$

If we call the unused carton machine time, M_c, then this formula takes care of that machine:

$$.04L + .04S + M_c = 360$$

Our customers get proper treatment in this formula where N stands for those to whom we do not sell:

$$2B + L + .25S + N = 10{,}000$$

One more formula and our "conversation" with the "brain" is complete. We must get a meeting of minds on how we speak about selling prices. This formula does it:

$$.15B + .20L + .075S = \text{Maximum}$$

Just have this set of formulas run through by an "electronic brain" manufacturer and he'll hand you back your answers—including the number of boxes and cartons you should produce, the number of customers not sold, coldroom space not used, machine time not used, what it will cost if you alter the product line in contrast to the "brain's" recommendations, and what you can afford to spend to relieve any bottlenecks discovered by the "brain."

Here, we took a special kind of problem. You can now alter this in your mind to fit your other problems. Put it this way: You have one mathematical equation (usually concerning gross returns) which you want to maximize. Or you may have one (usually concerning costs) which you want to minimize.

All other equations deal with expressions of plant operations or marketing conditions. These equations always allow for unused resources. These are the only formal characteristics. The flexibility is almost unbelievable.

When to Use "Brain"

Whether you use the "bain" depends upon the size of the problem. The "brain" simply speeds up the arithmetic. If you have more than 6-to-8 products, these problems get rather involved. Then, a "brain" pays off.

Regardless of whether you use a machine or not, the problem is framed in the same way. Actually, our example was too simple to be very realistic. So let's see what's involved in a real-life problem. We need some quite definite rules concerning the business aspects of these matters if we are to trust their solution to this machine that "thinks" in straight mathematical terms.

Rules for More Complex Problems

Sort out limiting items: As a starting point, we look at those items in our plant which are *fixed* in amount. These generally include physical facilities (machines and buildings), and certain labor inputs. However, only those items which might possibly limit production are included at this point.

For example, plant labor, storage room, and packaging machine capacity may be the only items which provide bottlenecks. Excess capacity exists in all other items. Then you would tabulate the amount of each (see Table I). Of course, we may need to list many more than three.

Be sure to consider only the available quantity of each item for direct production of products. Thus, in the case of machine capacity, we must subtract the indirect time requirements (for setup, adjustment, and cleanup) from total machine time to give us the available quantity of machine running time which can be used for product production.

In the case of labor and other limited inputs, we likewise subtract the indirect requirements from total quantity to give us that available for direct production. Thus, the general rule, in the case of all limited items, is to subtract any portion of that item which is not used directly in product production.

Calculate inputs of limiting items per unit of product: Our next problem becomes one of determining the input requirements of each limiting item for each unit of product produced. Two refinements should be noted in this case:

First, in developing the per-unit input requirements, only the direct inputs are included. The indirect inputs are not pro-rated to the various products. *Second*, in addition to comparing alternative products, we can consider separately each alternative way of producing the same product. If we do this, we handle each alternative process just as if it were a separate product.

These data are usually in physical terms, but can be in accounting ratios or a host of other forms. We usually come up with data like those in Table II.

Calculate inputs of unlimited items per unit of product: In general, this group includes those items which are not fixed and which do not limit production in any way. Also, they are *direct* cost inputs. They involve a direct cost to the firm and vary directly with product production. Usually this group includes such items as direct material, direct manufacturing and direct distribution costs. All of these are put on a dollar and cents basis, as shown in Table III.

Determine market forecasts: Our final step involves determination of market forecasts for each product. Here, we make usual forecasts of sales of each product at given prices. Also, the direct costs developed above are subtracted from market selling prices to give what we will call net selling prices. Data calculated from these steps are summarized in Table IV.

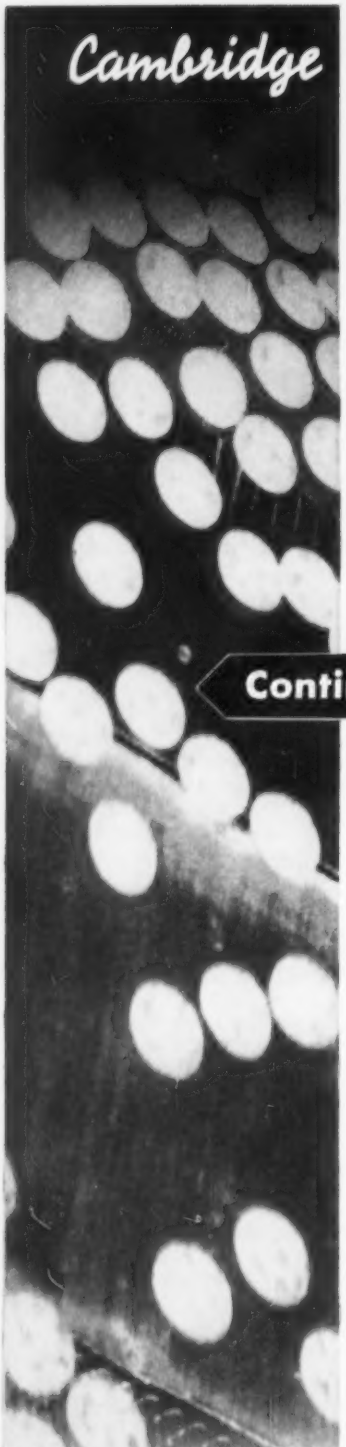
These are the raw materials out of which we set up the formulas for the "brain." These calculations are much like those your comptroller now makes. However, these rules have new twists. Follow them closely. You can adapt them to suit your situation. Any reasonable operating or market situation can be framed in mathematical formulas if you derive your data to explain your situation.

Type of Answers Received

Linear programming gives answers that make sense. Look at this imposing list of different answers which come directly from linear programming:

1. What products should be produced, and how much of each product. In our example (see Table V) only five of the seven products should be produced if the firm is to maximize profits (see Col. 2 in table).

2. Changes in revenue which result from increased sales of various



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products. Referring to Col. 3 of the same table, another unit of products A, C, D, F, and G would add 3, 2, 10, 4 and 1c., respectively, to gross returns. This shows what we could do to gross returns by expanding our market for these products. Such aids are invaluable for sales management.

On the other hand, we did not sell all the market would take of some products because certain bottlenecks forced us to give up production of something else to produce these products.

Sometimes we still want to produce an item for competitive or public relations reasons. If so, we know just how much gross returns would be reduced. For example, products B and E would reduce gross returns by 10 and 8c., respectively, for each additional unit produced.

3. Use of the limited resources when the "best line of product" is produced. Here, see our Table VI. And note (Col. 2) that storage room and packaging machines were both bottlenecks. Plant labor and processing machine time were not used to capacity.

4. Changes in gross returns if we can eliminate bottlenecks. In our Table VI example, note (Col. 3) that we can pay $20 a square foot to relieve the storage room bottleneck. It is worth $1 a minute to increase our running time on the packaging machine. More labor or processing machine time would be worthless to us, since we didn't use all we had before.

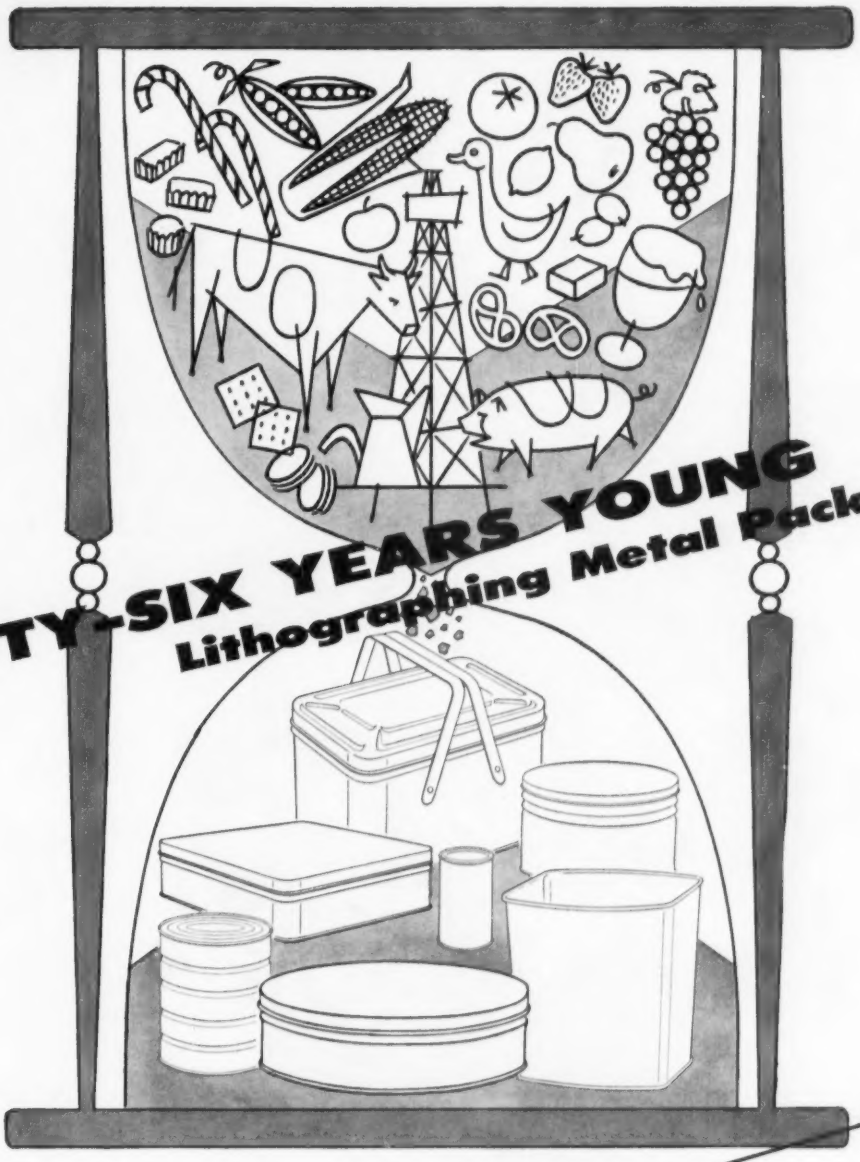
5. Gross returns to cover cost of our limiting items. Here, our gross returns figure requires a bit of explanation. It is the last dollar we can get to cover the cost of our list of limiting items and any other costs we have not included in the problem. This gross-returns figure does not guarantee profits, but it does guarantee that we are getting *the largest return to cover these other costs.*

To arrive at your net profit position, you merely subtract, in lump sum, the indirect, or other costs listed as limiting, plus those not subtracted when you calculated net selling prices.

One thing is sure: Today's problems are complex. Hence, you are probably now encountering planning data that fit this type of 'brain' calculation.

So, in the modern management way, try this method and machine designed for modern problems.

The third article in this challenging series is scheduled for November FE. Watch for it. —*End*



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Speeds Frozens—*Arkansas to Anywhere*

Finding a really feasible way to deliver low-temperature foods over great distances to points off the beaten path took a lot of figuring by Holiday Division of Swift. Answer was this company-owned refrigerated transport

PROBLEM: How can you assure speedy delivery of frozen food products to a variety of destinations—company plants, storage warehouses, and chain grocery stations—spread from Maine to California and generally off the established routes?

It was this question that faced Holiday Food Co., Division of Swift & Co., which has a flourishing processing operation, in Van Buren, Ark., turning out frozen meat and fruit pies.

In considering all the specific factors posed, the company questioned the feasibility of rail transport, finding it to be 'involved'; routewise, and not fast enough. As for common carriers, there was also a difficulty: These services tend to shun runs off regular routes without full loads. And as for contract carriers there would be a drawback where the service didn't hold all operating rights necessary to cover such a sweep of destinations.

The final decision—now proved-out by successful experience over a year—was a company-owned unit.

This is a low-temp, transcontinental tractor-trailer run by two truckmen, alternately driving and resting in the sleeper cab. This carrier transports top loads of 3,000 doz. pies on straight-through runs (stopping only for gas and servicing).

To stay within the legal limits of all states, the total length of this transport vehicle was specified as not to exceed 45 ft. Maximum loads have been assured by using a cab-over-engine tractor, thus permitting greatest trailer length within the 45 ft. The tractor is an International close-coupled, 2-axle unit.

The trailer employed is a heavily insulated Trailmobile equipped with a mechanical refrigerating unit (Thermo-King RL-30). Maintained inside are zero-or-below temperatures.

This tandem-rear-axle carrier hauls from 22,000 to 30,000-lb. payloads, depending on the gross weight limits of those states through which it is routed. Top loads have been valued as high as $12,000.

When its outbound delivery is completed, the unit is routed back to pick up raw materials for the company's products—meat, dressed poultry, lard, flour, fruit, and vegetables.

Although company owned (as distinct from common or contract motor carriers), the unit is, of course, still subject to the same ICC Motor Carrier Bureau safety regulations, relative to mechanical condition and driver operating hours.

This type of private operation invites checking on a number of factors —such as area of delivery, volume, frequency, and seasonal uniformity—where a "tight" cost comparison with contract-carrier services are sought.

However, this company has already found use of its own equipment to be highly satisfactory, particularly on the score of convenience in handling the varying schedules.

Vital Do's and Don'ts—

If FDA Cites Your Plant

The law provides for an informal citation hearing . . . YOU must provide the clear thinking and constructive action needed to present your case effectively. Here's how

SECOND OF TWO SPECIAL ARTICLES

RAY MILLARD

Executive Director, J. Carl Dawson & Assoc., St. Louis

YOUR LAST CHANCE to steer clear of prosecution, should your plant be cited by FDA, is at the citation hearings—a private and informal meeting with an FDA official.

You'll likely get notice of such a hearing if it has developed that some plant-sanitation situation or practice appeared below standard to the FDA agent who inspected your place.

Having already covered the routine of such inspections, along with points the wise operator should observe when the government agent calls,* we will now consider the best ways for you to meet this more serious problem.

* "What to Expect, What to Do, When FDA Inspects Your Plant," FE Sept., p. 78.

Unfortunately, an FDA citation frequently throws management into a state of consternation. Thinking becomes warped. Hasty and unwise actions sometimes ensue. Though such a hearing notice should never be treated lightly, it should always be taken calmly.

First, and very important, here is a list of DONT'S that should be observed in 'conditioning' yourself to act swiftly and constructively in such a situation—

8 Things NOT to Do

. . . DON'T waste your time and energy puzzling over any such question as "Which competitor turned me in?" Such thinking only generates retaliatory attitudes that hurt the industry as a whole.

. . . DON'T fret with resentment against other food-plant operators who, in your view, are "getting away with murder"—whereas you're the "Martyr being haled before the authorities." Remember: They may be cited next week.

. . . DON'T indulge in pathological longing for the "good old days when people seemed to get along with little or no sanitation." Ask your insurance man what part sanitation has played in prolonging your life expectancy.

. . . DON'T call in your accountant and have him add up the dollars you have spent on sanitation in the past year. FDA officials are more interested in how *effectively* you spent your sanitation dollars than in how *many* you spent.

. . . DON'T accuse your suppliers of sending you contaminated or infested raw materials. It remains that they must operate under the same law that has you on the carpet. Besides, you are responsible for purity of your raw materials and should have an efficient system for checking them before they are introduced into your plant.

. . . DON'T blame your extermi-

nator. All he can do is kill those insects and rodents present in your plant at the time of his periodic visit. It is up to you to set up preventive measures to keep them out and make your plant uninviting to them. Some plant operators do not fully realize that combating insects and rodents is only one phase of an overall sanitation program.

. . . DON'T try to shift the onus onto your employees. It is your responsibility to train them in sanitary work habits, provide them with sanitary tools and facilities, and instill in them a pride in a sanitary operation. In short, it's your job to be constantly vigilant in supervising your sanitation program.

. . . DON'T blame anyone but yourself.

Now, with the above mental roadblocks out of the way, you can proceed with a calm appraisal of your situation.

Review the causative incidents with those responsible for operations and sanitation. Call in your lawyer to find out the legal aspects. Also get your sanitarian—or a professional sanitation consultant if you don't employ a sanitarian. Put your plant's sanitation program under a microscope. Plan both immediate and long-range corrective measures.

And now the positive approaches—

10 Things to DO

1. Go over Section 305 of the Food & Drug Act with your lawyer. The law permits you to file your views orally or in writing, in person or by letter. You may present them yourself or through a representative. If appropriate, you may include a guaranty from suppliers in your presentation.

Your attorney and sanitation consultant may accompany you to the hearing. You may even ask for a postponement, if you can show reasonable grounds for such a request.

2. In reviewing the events that led to your citation, ask yourself these questions:

Did I, or some responsible member of management, accompany the inspector on his tour? . . . Did we take notes? . . . What did he criticize? . . . What could he have seen in addition to the things he criticized? . . . Did he take samples? . . . Did we take duplicate samples and have them analyzed? . . . Did we tell him we were going to correct the unsatisfactory practices? . . . What steps have we taken to do it?

3. Have your sanitarian make a thorough survey of your plant. Through his inspection, he will be able to pinpoint the conditions which probably led to your citation.

At the same time he will be able to compile recommendations for correcting insanitary conditions, and to blueprint a sound program for the future.

4. Take immediate steps to put the above-mentioned recommendations into effect. If new or additional equipment is necessary, order it. Get started on an employee-sanitation-training program. Make all recommended changes in your purchasing, storage, processing, handling, packaging, and cleaning methods.

Schedule the adoption of each recommendation and adhere rigidly to this plan. Obviously, what you are striving for is the highest possible sanitation level BEFORE the hearing. Any recommendation resulting from the hearing should also be put into effect as soon as possible.

This not only proves your good faith but also prepares you for a possible follow-up inspection.

5. Having set your house in order, you are now ready to prepare for the hearing.

Probably the FDA official will not be a lawyer but a college-trained civil servant well grounded in some field of biology—a man with a professional knowledge of good sanitation. And you certainly may expect him to be genuinely interested in protecting the public from insanitary foods.

With a firm grasp of sanitary conditions in your plant and a clear idea of what the hearing involves, you may begin organizing what you have to say at the hearing.

"DON'T SPARE THE EXHIBITS."

6. Assemble as many records as possible of corrective measures you have instituted, such as contracts and purchase orders. Take photos or make sketches to demonstrate improved conditions. Gather samples of printed matter being used to indoctrinate your employees in sanitation principles.

Also, have a competent laboratory run samples of your product in a check for extraneous matter. These analyses will be an important part of your report.

7. Make a written presentation with the aid of your sanitation consultant. He will be able to summarize the steps you have already taken and outline future improvements to which you are committed. Bring several copies. The hearing officer will need duplicates—to send to Washington and for his own files.

8. Appear before the hearing officer in person. Ask your sanitation consultant to accompany you, since he will also be able to contribute information.

As for your lawyer, have him appear as an observer. And keep him informed of all developments so that he can defend you properly should court action follow.

The hearing officer will ask you who is responsible for plant operations. Remember that the person so designated may be subject to fine, imprisonment, or both, if unfavorable court action results.

9. At the conclusion of the hearing, the FDA officer will dictate a summary of the proceedings in your presence. You will be given an opportunity to comment on, or suggest changes in, any part of this summation. You may also request a copy.

10. When you leave the hearing, resolve to complete with utmost dispatch all sanitation improvements to which you have committed yourself.

Whether court action is to be taken will be decided by FDA officials. It was your task at the hearing to show cause why prosecution proceedings should not be instituted.

The seriousness and extent of the violation will be an important factor in determining the course of further action.

However, if your presentation showed true sincerity, and you have demonstrated a constructive program of corrective action, you can expect all this to be favorably reflected in the treatment you receive. —End

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Treatment "A" Proves Best for Protecting Berry Boxes

Field figures covering trials of three different fungicidal treatments show number and percent of boxes that became moldy, also quantity of boxes still usable, after a season's use. A fourth method that employs wax (described in article) stopped the mold but was ruled out as overly-costly and complex.

Treatment	Number of Boxes Tested	Moldy		Usable	
		Number	%	Number	%
Control	254	211	83	41	16
A. Sodium orthophenylphenate	304	26	9	257	85
B. Sodium orthophenylphenate plus emulsion	353	50	14	284	80
C. Organic-zinc formulation	126	33	26	86	68

Low-Cost Dip Checks Fungus Rot on Wood Boxes

Field testing proves out new chemical treatment, easily applied to berry hallocks . . . Life of these carriers greatly extended

JOHN E. BREKKE, E. R. WOLFORD, J. A. SACKLIN, and FOLKE JOHNSON

First three authors are with the Western Utilization Research & Development Div., USDA, Puyallup, Wash., and the last is with the Plant Pathology Dept., State College of Washington, Puyallup.

EXTRA COST AND BOTHER often are faced by food processors who use hallocks.

This is because of the necessity for frequent replacement of these carriers due to their destruction by mold.

Certain foods may be singled out as accentuating this problem—with berries "hitting the wood" hard.

But now berry packers have an "out." For a new fungicidal dip* gives a high degree of protection to wooden containers used to haul fresh berries from field to plant.

The low-cost protection lies in soaking the shook, or strips, from which hallocks are made, in a solution of 1.25% sodium orthophenylphenate tetrahydrate in water.

After treatment they are about ten times more resistant to mold growth as before. Also, mold count on berries in the container is slightly reduced. And residual fungicide in the fruit is below 1 ppm.

The preservative can be added to the water in which hallocks are normally soaked before forming. And cost of this treatment is but 30c. per 1,000.

In our work at the experiment station, we selected the above method as the best, after conducting the tests outlined below.

First, there were initial laboratory trials that narrowed the possible treatments down to the four most promising ones. Then each of these methods was rated during normal use of hallocks in harvesting berries. Special markings enabled us, with processor's cooperation, to reclaim and identify hallocks for examination.

In the first season, half of every lot was washed after each use. The others were not washed at all. The following fungicides or water repellents were tested: Sodium propionate, heavily chlorinated (400 ppm.) water wash, sodium orthophenylphenate dips (0.5 and 1%), resin and petroleum solvent mixture, organic-zinc compound in petroleum solvent, plastic film (applied as an aerosol), paraffin-miscrocrystalline wax, coating, and a wax-water emulsion dip.

Evaluation was by examination of surfaces for mold growth. Black mold material first accumulated on the inside surfaces as tiny dots, then spread to form a more continuous dark stain, and eventually became a thin encrustation. Finally the hallocks became too filthy for storing fresh fruit.

Fungicide treatments prevented, or greatly reduced, the fungus growth. Washing had considerable merit in forestalling accumulation of

*Developed by the authors at the Western Washington Experiment Station, State College of Washington, Puyallup.

Close Focus on Problem

Berry packers often employ small wooden boxes (hallocks) that run about 5¼-in. square by 2¼-in. deep. They're made of wood strips (or shook) about $\frac{1}{16}$-in. thick.

These boxes are filled with berries and hauled to the plant in wooden crates (flats). Then a few days later, flats and empty hallocks are returned to the fields for the next loads.

But after repeated use, the hallocks become contaminated with berry juice, dirt, and mold. And once mold growth is established, ordinary washing won't remove it.

Some processors prefer not to wash, reasoning that drier wood will not so readily support the growth of mold. Washed or not, however, the boxes become contaminated and then must be discarded as no longer suitable for carrying the fresh fruit.

Since a hallock costs only about 1.5¢, any preservative treatment should cost but a small fraction of that. Also, a dry-wood treatment requires stacking to dry, unstacking, treating, and restacking, hence a wet method is simpler.

This article details such an easy, wet treatment, with cost a mere 0.03¢ per hallock.

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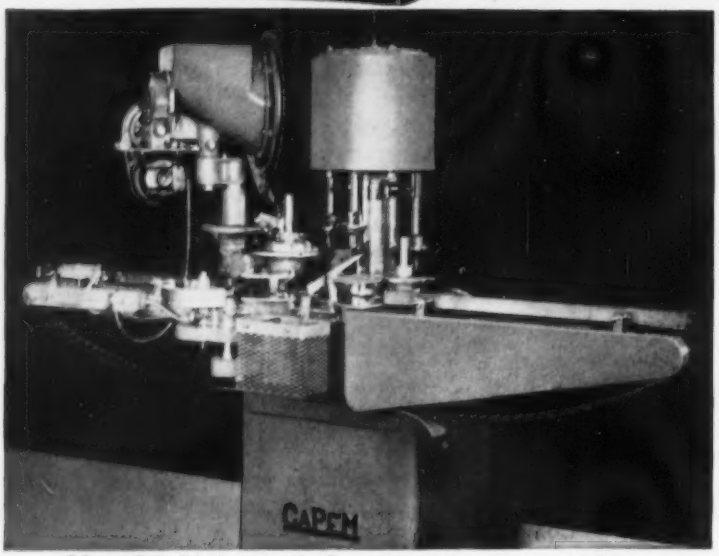
SKYROCKETING
CAPEM SCREW CAPPERS
WILL BRING THEM
DOWN



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mold in untreated hallocks, but eventually the mold rendered them useless. If treated with insoluble fungicides or with heavy wax coatings they lasted the season.

During the second season a larger test included 1,800 hallocks divided among the four most promising treatments and a control (no treatment). The treatments follow:

A. Sodium orthophenylphenate: New, wet hallocks immersed in water 15 sec., and drained 5 min. to insure that they presented a uniform wet surface in subsequent treatment. This also economizes on agent.

Then they were dipped 15 sec. in a 1.25% solution of sodium orthophenylphenate tetrahydrate (3% solution of a commercial preparation containing 42% sodium orthophenylphenate tetrahydrate), drained 1 min., and placed in crates (called flats).

Foreshadowed by this new anti-rot agent is increasing success in fungicidal painting and dipping. Also seen are additional applications such as to packaging materials.—*The Editors*

B. Sodium orthophenylphenate plus water-wax emulsion: New, wet hallocks treated as in (A), dipped in dilute emulsion for 15 sec., drained 2 min., and placed in flats.

C. Organic-zinc preservative and wood sealer in mineral spirits: Air-dry hallocks dipped 15 sec. in a bath of 1 part commercial preservative and 2 parts mineral spirits, drained 5 min., and placed in flats.

D. Paraffin-microcrystalline wax: Air-dry hallocks dipped 15 sec. in a bath of wax mixture at 160F. (5% microcrystalline wax, 95% paraffin), drained 5 min., and placed in flats.

Results of this testing are given in the table on p. 95.

In addition there were the special tests showing that sodium orthophenylphenate brings a small reduction in the mold count on the berries in the containers.

Two washings during the season served to clean the treated hallocks. But effect of such washes on those untreated was scarcely perceptible.

Soaking shook before forming hallocks is as effective as method described in "A" above. Treatment before stitching involves less labor, thus is less costly.

Acknowledgement is made to Drs. C. D. Schwartze and W. M. Mortenson of the Western Washington Expt. Sta., for aid in the field tests; to L. R. Leinbach for the residue analysis; and to Vis-Ko, Inc., Sumner, Wash., for the sodium orthophenylphenate formulation.

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If you're considering a product improvement or a new product, you'd do well to investigate Pro-80 protein enrichment. Recognizing the increasing consumer preference for high protein foods, many successful food processors have turned to our Pro-80 Vital Gluten (80% pure wheat protein m.f.b.) to build greater food value into their products. They've been rewarded with additional volume. Possibly you will too.

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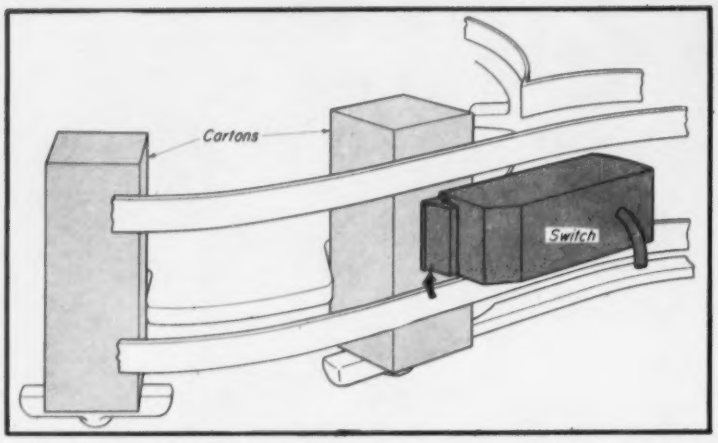
Clogging with smashed cartons curbed by new unit—minimizing machine downtime, ending waste of containers and product, and saving extensive clean-up labor . . . Device also enables rearrangement of filling rooms for more efficient use of manpower



SENSITIVE TRIGGER (arrow) flicks when contacting a deformed or broken carton. This activates switch, bringing machine to smooth stop.

Automatic Brake Stops Costly Jam-Ups at Filler

FE STAFF

PARADOXICALLY, your efficiency in *running* an operation can depend on the efficiency with which you are able to *stop* it.

Particularly in point are dairy filling operations: When you have a carton jam-up and the unit isn't stopped directly, the machine clogs with broken containers and there is a mess of spilled product, with the trouble compounding as long as the feed continues.

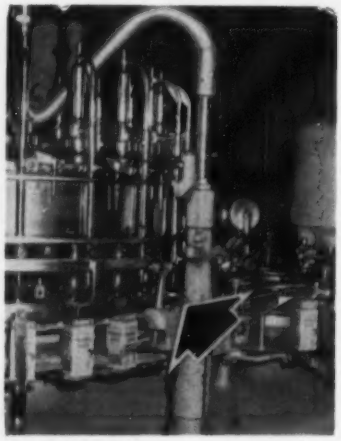
As a result, product and cartons are lost, you're in for a big cleaning and maintenance job entailing much time and labor, and your production is "down" for an inordinate time.

Prior operations on the line are thus crimped as well, likely all the way back to the receiving platform. And if cartoned milk is in short supply, truck loading at the end of the line may be held up, too.

Considering the range of plant duties and responsibilities, keeping a constant watch has been a problem. Preponderantly, such shutdowns have occurred while supervisors were absent. Laxity of workers has also been an element.

Needed was some means to eliminate dependence on the human factor for reacting to these emergencies. But how handle it practically? This question has long gone unanswered.

Now, however, Joseph Kaich, president of Beverly Electric Corp., Long Island City, N. Y., has supplied what is proving to be a most feasible solution. He's invented and patented a special switch (Detecto-Mat) which, when coupled to a Dynac electrical braking system (Westinghouse), effectively stops Canco #176 fillers the moment jams develop.



ONE SWITCH goes on input side of filler (arrow). Another is on discharge side. (Sealtest Sheffield Farms, NYC)

Success of these switch units was immediate, and they are now installed on over 40 machines in a dozen New York area plants.

Many Advantages

Users report almost complete elimination of machine downtime, great reductions in crushing of containers, minimum wasted product, and far less labor in clearing the machines and re-starting operations.

Moreover, there's increased safety for personnel. And further, the machine itself is protected because it is stopped in such manner that no wear-creating stresses are put on it.

Formerly, jam-ups brought loss of at least 10 containers—the minimum number carried around by the machine's inertia when the trouble was caught directly. At times, up to 50 containers were destroyed, along with many quarts of product.

This has now been cut to one, or at most two, cartons. And since stop-ups occur most commonly on the in-put side, the lost containers are empties, hence no product is wasted.

Another advantage: The operator can now clear the unit in a few seconds. Previously, when a major jam occurred, foreman and mechanics would scramble over the machine for

A new line of Standard Oil greases

RYKON

GREASE

Major breakthrough in grease technology results in development of new thickening agent. New grease has greater high temperature stability, superior multi-purpose qualities, improved lubricating properties.

Standard Oil instituted a grease research and development project several years ago. The result of this work is the line of RYKON Greases, which contain a unique new non-soap, organic thickening agent.

RYKON Greases surpass in stability and performance the best greases made up to this time. They bring to industry new opportunities for improved machine performance. They greatly reduce the maintenance and grease handling problems encountered in industry.

RYKON Grease properties

RYKON Greases are smooth, buttery-textured greases, made from the finest quality, solvent-extracted oil. Their thickening agent is a Standard Oil exclusive. RYKON Greases have these high-quality characteristics:

High temperature stability—Better heat stability than any other petroleum oil grease. ASTM dropping point of 480°F. Maintain consistency in service at high temperatures.

Mechanically stable—Maintain consistency even under severe mechanical working in service.

Chemically stable—Inhibit oxidation. Oil and thickening agent in combination possess extremely good chemical stability.

Wide temperature range—Lubricate at high and low temperatures. Extended range of application thus obtained makes RYKON Greases truly multi-purpose.

Water resistance—Do not lose consistency in presence of water. Highly resistant to water washout.

Oil separation—Minimum bleeding of oil in service and storage.

Anti-rusting—Exceptional natural rust preventive characteristics.

With RYKON Greases, lubrication can become simple, foolproof and less expensive—much less expensive, perhaps, than a single shut down caused by equipment failure due to the use of the wrong type of grease or the use of an "economy" grease lubricant.

RYKON Greases come in four Regular and three Heavy-Duty grades. Thus there is a RYKON Grease to take care of every grease lubrication job. Using RYKON Greases plant-wide can reduce your grease storage requirements, simplify lubrication maintenance training, cut down record keeping, save on dispensing equipment and reduce investment in grease inventories.

Get more facts about RYKON Greases. Call your nearby Standard Oil industrial lubrication specialist in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Check Chart Of RYKON Greases

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RYKON Grease No. 0	0
RYKON Grease No. 1	1
RYKON Grease No. 2	2
RYKON Grease No. 3	3
Heavy Duty Line	
RYKON Grease No. 0 E. P.	0
RYKON Grease No. 1 E. P.	1
RYKON Grease No. 2 E. P.	2

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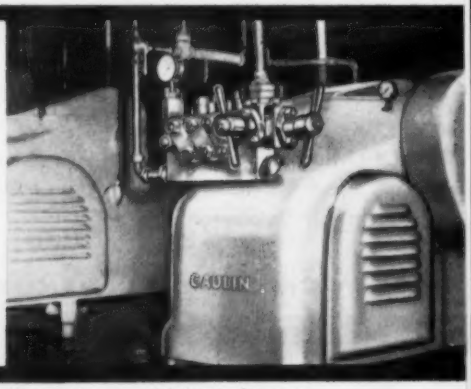

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up to a half hour in the rush to get it going again.

One specific installation is especially striking. Here, company executives were particularly enthusiastic over the brake's possibilities. And so they rearranged their filling room. Originally, there were a pair of two-machine operations. Now there is one operation comprising all four machines under the supervision of an operator who also watches over the automatic caser. Bright signal lights are lit automatically by stopped machines, drawing attention to them.

A word about reception of the device by employees: In one plant, where an active, intelligent management has built up good attitudes among its workers, the filler operator said, "A load's been taken off my mind. Now I can go about my casing job without forever having to keep a wary eye on the filler." He knows that if trouble occurs the unit will stop automaticallv.

Unfavorable reaction would appear to be limited to that type of employee who welcomes a jam-up as an opportunity for a work-time break.

System's Key Details

Two of the special switches are installed on each filling unit—where containers come off each starwheel (at input and discharge sides).

Specially designed for its job, the switch device is mounted with its trigger close to the outer rim of container travel. Thus it "catches" any deformation in a carton and so opens the holding circuit to the Canco motor controller.

Thereupon, the brake automatically goes into action. This unit applies direct current in the reverse direction, from a self-contained source, to one phase of an A.C. induction motor. The result: Smooth, gradual braking.

An adjustable timer controls the period that the D.C. circuit is open. This unit is set to allow the travel of 1¼ containers through the filler during braking. This provides for effective stops without damaging jolts.

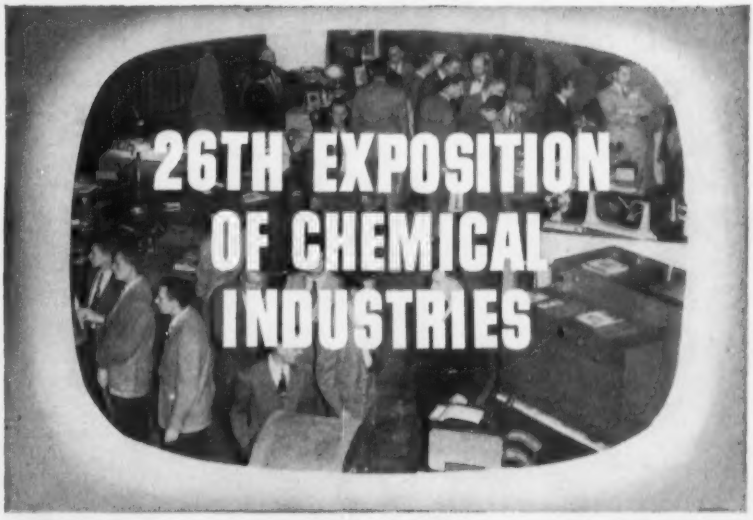
The filler is put back into operation by merely pressing the regular re-set button.

A recent accident at a large metropolitan dairy is typical of the troubles that can be prevented by the unit. Here, a mechanic sustained a grave arm injury when the filler was started up while he was still cleaning out crushed containers following a stoppage. With the new system, there is no such hazard, since the machine comes to a sharp stop whenever the stop-button is pressed.

Tune in on

What's New

at the



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DON'T MISS the greatest concentration of new and important developments ever assembled in one convenient location. You will come away with valuable and profitable new ideas.

Reserve Time and Place Now on Your Calendar.

New York Coliseum, December 2-6, 1957

26th EXPOSITION

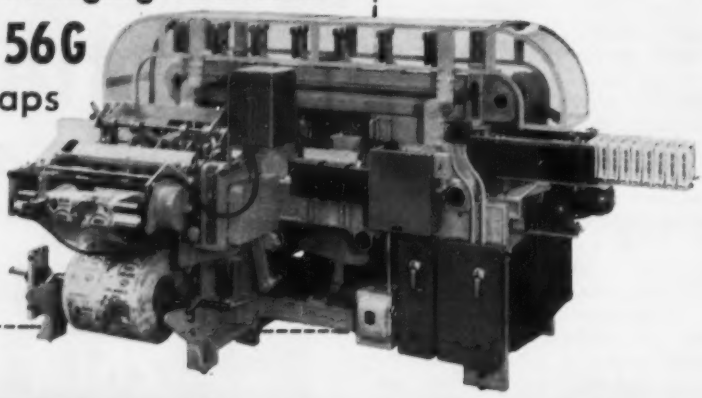
OF CHEMICAL INDUSTRIES

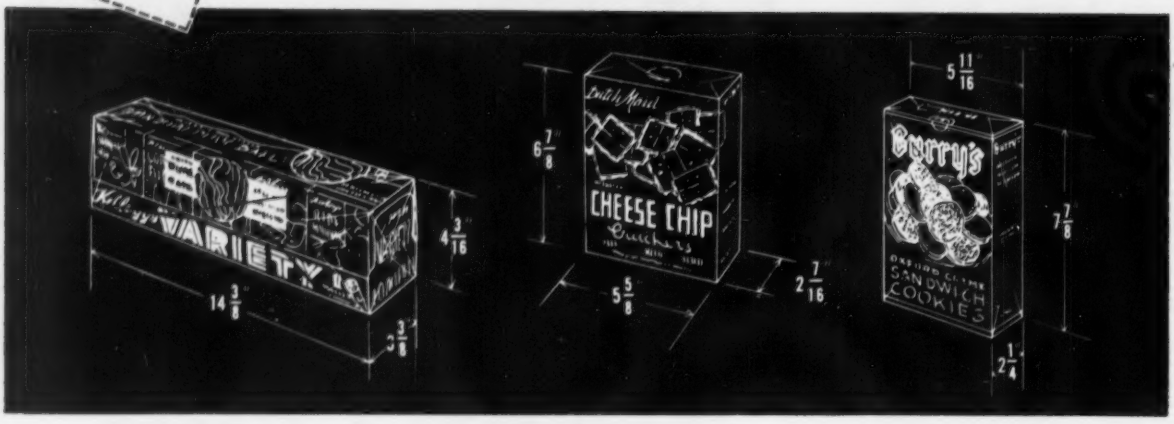
Management International Exposition Company

For more data, circle this page number on card at back →

This Battle Creek Packaging Machine Model 56G

has handled overwraps within these ranges at speeds up to 80 packages per minute





to produce packages like these

Kellogg Variety Pack
Broad Panel Display
Maintains Eye Contact

Dutch Maid Cheese Chip Package
Is Economically Wrapped by the
"Continuous Flow" Process

"Continuous Flow" Packaging
Gives High Sales Appeal to
Burry's Oxford Creme
Sandwich Cookies

SPECIFICATIONS

Model 56G—Battle Creek's Model 56G is a dependable packaging machine incorporating all the special adaptations and developments of the high speed *"Continuous Flow"* principle. A key feature of this machine is its ability to put the seam on the narrow edge of the package thus permitting full display of the broad panels for maximum merchandising effectiveness. The standard machine includes the motor, variable drive, electric clutch with brake and one shot lubrication while other merchandising and production equipment such as refrigeration, electric eye, code dater and electronic heat controls are available on special order. The size range covered encompasses a length from 5" to 15" long, a width of 2½" to 8¼" and a depth of 1" to 5" with an average size changeover time of about 20 minutes.

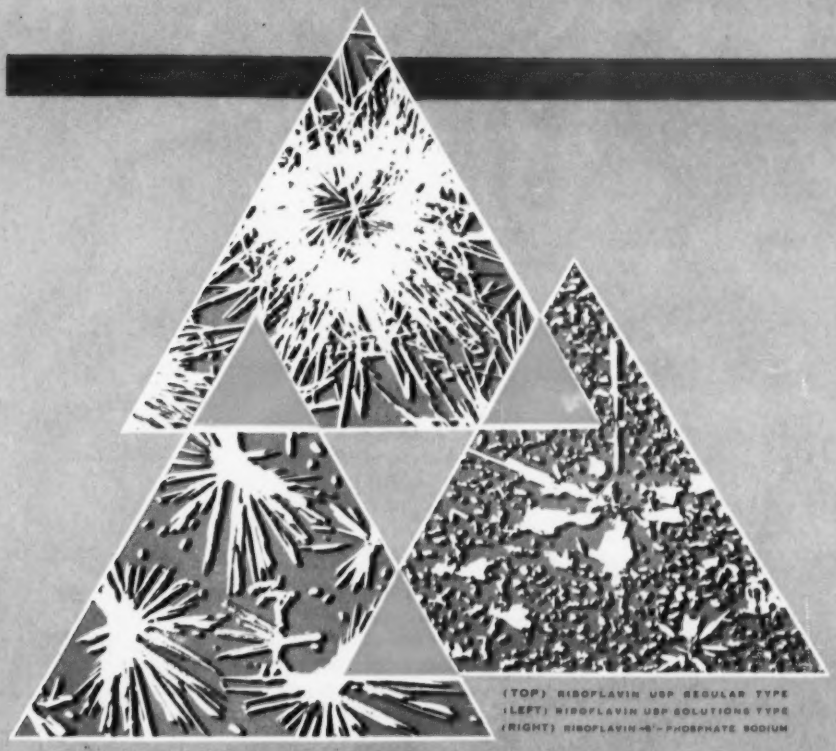
Call on Battle Creek Packaging Machines for quick, complete service on your packaging problems.

"Continuous Flow" Packaging

BATTLE CREEK
packaging machines, inc.

109 TWELFTH STREET, BATTLE CREEK, MICHIGAN

See us at The Packaging and Materials Exposition, March 25-28, 1958, Atlantic City.



(TOP) RIBOFLAVIN USP REGULAR TYPE
(LEFT) RIBOFLAVIN USP SOLUTIONS TYPE
(RIGHT) RIBOFLAVIN-5'-PHOSPHATE SODIUM

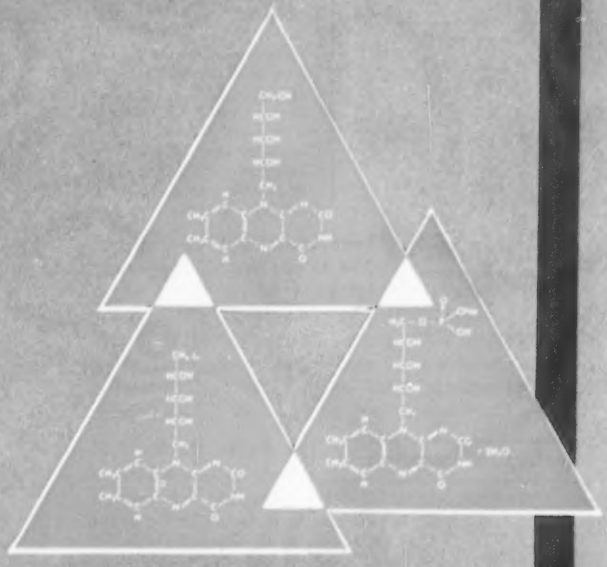
VITAMIN B_2 COMES RIGHT FROM ROCHE

Various types are available to meet the most exacting demands in the pharmaceutical field for tablets, capsules, dietary supplements, liquid preparations; and in the food industry for enrichment premixes and breakfast cereals. Roche has the type of riboflavin that is right for you, whenever you want it—"by the tons."

Roche originated riboflavin-5'-phosphate sodium for all solutions demanding rapid, high solubility, and stability. Among pharmaceutical manufacturers it is preferred for injectable solutions, elixirs, and multivitamin drops. A better, less bitter taste than U.S.P. riboflavin makes it advantageous for chewable tablets and other products likely to be held in the mouth. In the food field it is preferred for breakfast cereals.

The Roche synthesis achieves quality standards that meet, or even exceed the rigid U.S.P. riboflavin requirements. This assurance is insurance for you.

Trust Roche resources for a constant, unlimited supply of riboflavin. Trust Roche for quick, sure service.



ORDER *right* . . . ORDER *from Roche*

VITAMIN DIVISION

HOFFMANN-LA ROCHE INC.

NUTLEY 10, NEW JERSEY, NUTLEY 2-5000 • IN NEW YORK: OXFORD 5-1400

(Illustration represents actual crystals under high magnification, using shadow technique.)

Important Riboflavin Development

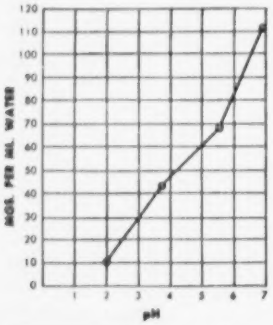
✓ **Higher solubility** ✓ **Better taste**

✓ **No solubilizer needed** ✓ **Commercial production**

USE ROCHE RIBOFLAVIN 5′-PHOSPHATE SODIUM

higher solubility

Now you can make clear solutions with a concentration of 30 mg. or higher per ml. of water when you use the new Roche riboflavin-5′-phosphate sodium. No longer do you need to use solubilizers and special techniques to achieve a satisfactory solution. Remember the trouble you had in getting a solution of even 2 mg. of riboflavin per ml.? Those days are now past.



SOLUBILITY of Roche riboflavin-5′-phosphate sodium in water at different pH levels; room temperature.

These data show that solubility of Roche B_2 phosphate sodium depends on hydrogen ion concentration in water. It is useful to note that the solubility of riboflavin U.S.P. (approximately 0.12 mg. per ml.) inserted on graph would fall just above the base line.

specifications

Tests show that B_2-5′ (M.W. 514.4) has the full theoretical activity on the molecular basis of riboflavin (M.W. 376.36). Theoretically one gram of the phosphate is equivalent to 0.73 grams of riboflavin. The Roche product contains small amounts of moisture, disodium salt, diphosphate ester and unesterified riboflavin. It has a riboflavin activity of 70-73% by weight.

biological availability

Roche riboflavin-5′-phosphate sodium has immediate biological activity because it is identical with the natural flavin mononucleotide occurring in the "yellow" respiratory tissue enzyme system.

better taste

Roche riboflavin-5′-phosphate sodium does not have the intensely bitter taste of riboflavin itself. It is more palatable in high concentrations. The different taste is of definite advantage in oral preparations.

solubility—taste demonstration

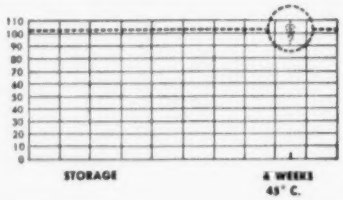
You can prove to yourself, easily and quickly, the solubility-taste advantages of Roche riboflavin-5′-phosphate sodium with the Roche demonstration kit. Ask your Roche representative to show it to you. Or we'll be glad to send one, without charge, at your request.

cost comparison

Even though the cost of Roche B_2-5′ is somewhat higher than regular riboflavin, its use can result in actual savings. You eliminate expensive solubilizers and unnecessarily large amounts of niacinamide. You reduce or eliminate costly complaints and returns. You are able to make manufacturing economies.

stability

Chart demonstrates stability of Roche product in B-complex parenteral solutions with and without vitamin C over wide potency range.



uses

The new riboflavin-5′-phosphate sodium, probably the most important riboflavin development since Roche introduced the vitamin commercially in 1941, is specially designed for use in manufacturing:

- **pharmaceutical** vitamin injectable solutions, drops and elixirs, gelatin capsules and chewable tablets
- **food enrichment**, especially if by liquid application

CALL **ROCHE** FOR VITAMINS

VITAMIN DIVISION

HOFFMANN-LA ROCHE INC.

NUTLEY 10, NEW JERSEY • NUTLEY 2-5000

Pacific Coast distributor: L. H. BUTCHER COMPANY
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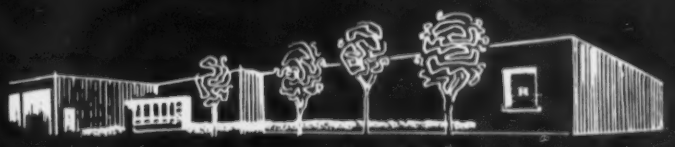
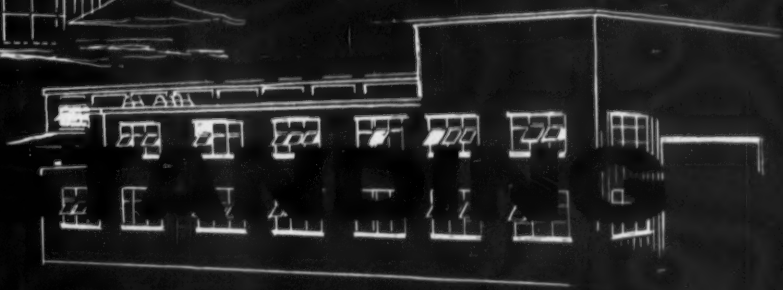
FE SPECIAL REPORT

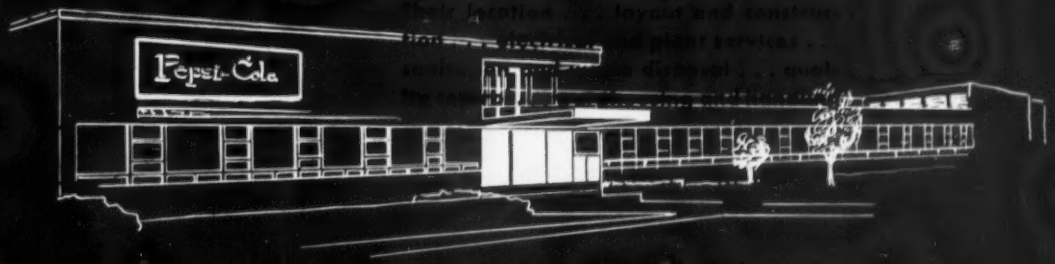


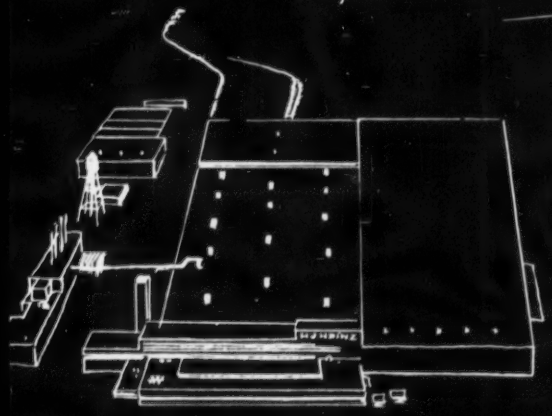
Jewel Tea

Schickhaus



FOOD PLANTS





McAfee

ON 73 ACRE SITE in fertile San Joaquin Valley, Heinz Tracy plant is enviably located from every aspect—raw materials, supplies, workers, transportation and domestic and overseas markets. Engineering-wise, it is a food industry pacesetter.

Plant in Land of Plenty

Located with an eye to the future, "57" factory is in area with rich crops and fast-growing domestic and overseas markets. Model advances engineered into every phase of its extensive operations

THERE IS no lack of advanced engineering in the non-processing features of the recently expanded Tracy, Calif. plant of H. J. Heinz Co. This firm is not guilty of a too common and costly food industry weakness—failure to keep up with progress in factory engineering.

Nor is the company slow to build more efficient plants in more favorable locations and to transfer older operations to them. This, too, is the story at Tracy.

Located in the rich San Joaquin valley, the plant is enviably near sources of primary raw materials. With two railroad spurs, three truck-loading docks, and with a main highway running past the site, sugar and other ingredients are readily brought in. And the 100,000 tons of finished products made annually are easily shipped out.

OUTSTANDING FOOD PLANTS

In fact, a high degree of accessibility is an outstanding feature of Tracy.

The Heinz plant has been expanding steadily and now embodies 620,000 sq. ft. of floor space on its 73 acre site. The first units were built, in 1945, the latest in 1957. Production this year will be five times greater than in '46. But where to expand presents no problem.

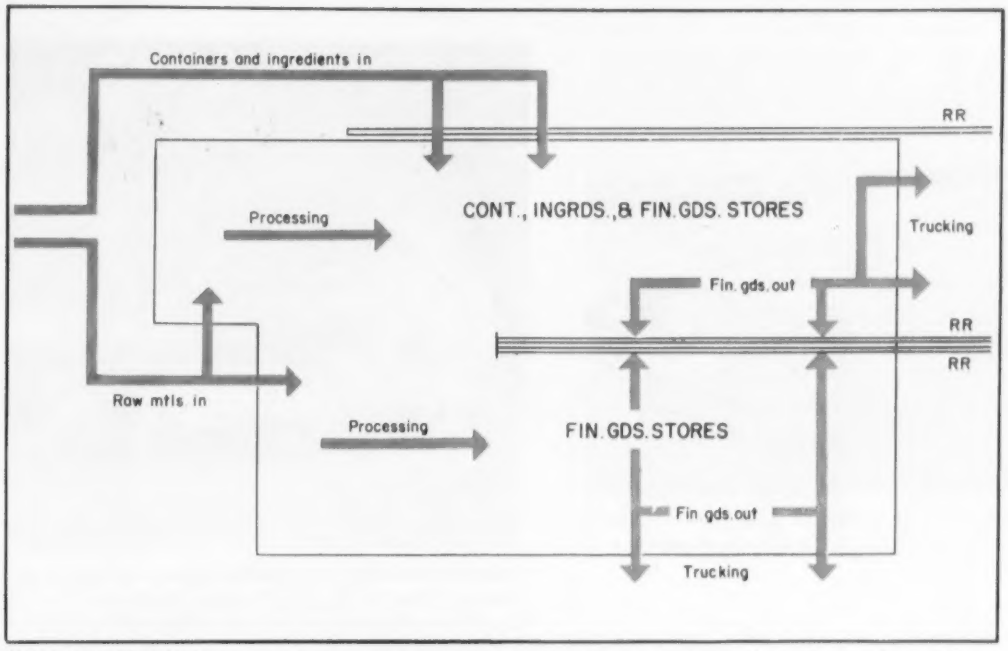
Inside the plant is a host of examples of reducing costs and upping efficiencies through engineering know-how.

Selection of Site

Reasons for putting the plant at Tracy go back to 1945. At that time Heinz management foresaw post-war expansion in the Western states. These men also were convinced that consumer demand for processed convenience foods was destined to grow rapidly.

So eyes turned toward California, particularly the San Joaquin Valley. It has 4 to 6 ft. of alluvial soil for producing raw materials. There is ample supply of water for irrigation. There is a long growing summer, and without rain to interfere with crop production and picking operations. Production from some 8,000 acres and 175 growers is used annually.

Being on a main railway line and a super highway, good transportation is available. And it is not far to an inland seaport, Stockton, through which to



NO BOTTLENECKS, no entanglements are encountered in receiving, production, and distribution flow at Tracy. Raw materials enter plant at front, go through processing, and to finished goods storage. Containers and ingredients enter process area from side. Finished products move from rear of plant, via two RR spurs and two trucking docks.

ship to countries in the Pacific, or through the Panama Canal to eastern U.S. markets. Tracy serves the West Coast, Southwest, the Rocky Mountain states, and also ships abroad.

Site space is no problem in this open, flat farm area. Good labor is available from the town and the farms. Tracy now employs 1,400 at the season's peak.

Power and water supplies are abundant. There is a municipal sewer for disposal of screened waste effluent. Most of the waste fruit and vegetable materials are trucked to dehydrators.

A principal ingredient, sugar, is produced in the region, and the plant uses 15 million lb. a year. Packaging and other materials are made on the West Coast.

One, of the finest research facilities, the Western labs of National Canners Association, is at nearby Berkeley. And this technical service is used frequently.

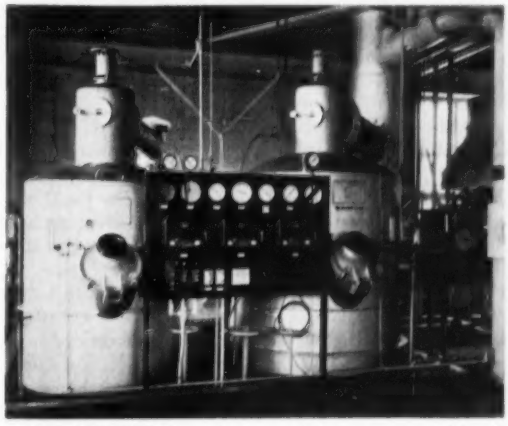
In short, the Tracy location has just about everything. It is even a convenient on-the-way stop for executives traveling from Pittsburgh headquarters to the Heinz operation in Australia.

It is not surprising then that both the administration and processing operations, formerly at Berkeley, Calif., have been transferred to Tracy. And an ultra-modern new office building with blue glass outside wall panels has just been erected to house the executive offices for all the firm's West Coast operations.

Oscar R. Hayes manages the West Coast manufacturing region. David S. Pribyl is Tracy factory manager.

Plant Layout and Construction

Because processing is changing so fast, Heinz builds "cubes" of enclosed space when it erects new factories.



EASY CLEANING and low maintenance are achieved through brick floors and tiled walls in process area. Here, tops of evaporators are surrounded by sanitary tiled "riser."

ALUMINUM Q paneling forms exterior wall of warehouse, floor is case hardened concrete containing iron filings, and wood is used in special roof supports.

POWERFUL VENTILATION is provided over cooking areas to carry off moisture vapor. Straight-line exhaust blowers handle 42,000 cfm. of air.

BUILDING-WITHIN-BUILDING houses quality control facilities, plant offices, and employee facilities. Centrally located two-story structure has space-saving outside walkways, is air conditioned.

This allows maximum flexibility in rearranging process and packaging lines, or in installing new operations.

Director of Engineering for Heinz, Harvey Dunker believes it might be well to take this flexibility one step further and build balconies around the walls to accommodate smaller pieces of equipment. These could feed by gravity to operations on the floor.

In the "general utility" cubical structure, layout is for continuous flow from raw material receiving to warehousing and shipping of finished products.

Efficient movement into and out of the plant is facilitated by two railroad sidings. One, which is enclosed, runs into the warehousing areas. The second is along the outside wall of a warehouse area.

There are truck docks on three sides of the factory, with easy truck access by plant-site roads connecting with the main highway. And parking facilities for employee's cars are more than ample.

High-capacity receiving and shipping facilities are a must. Some 125,000 tons of raw materials come into the plant annually. Shipments of nearly 100 forms of finished products are estimated at 100,000 tons.

Contributing to ease and efficiency of supervision in the plant is the central location of facilities for quality control, plus offices for the production manager and transportation and warehousing supervisors and washrooms for workers.

Masonry and steel is the primary construction. Outside walls of preparation areas are brick, those of storage buildings, concrete block.

Roofs over warehouse areas are supported by wood trusses, economical in cost. Not unusual in California, this construction employs the Maag truss developed during World War II when steel was short. But steel trusses support roofs over manufacturing areas where some moisture necessarily is present in the air.

Ceilings are of reinforced concrete, and those exposed to the California sun are insulated, both in storage and manufacturing areas. Different materials are employed, among them Foamglas, which is particularly liked because it is not affected by moisture. Ceiling heights are 14 ft. in kitchen areas; 20 ft. in processing and filling rooms; and 24 ft. 2 in. in warehouse area to permit high stacking.

Walls in "kitchen," or process areas, are tiled to the ceiling.

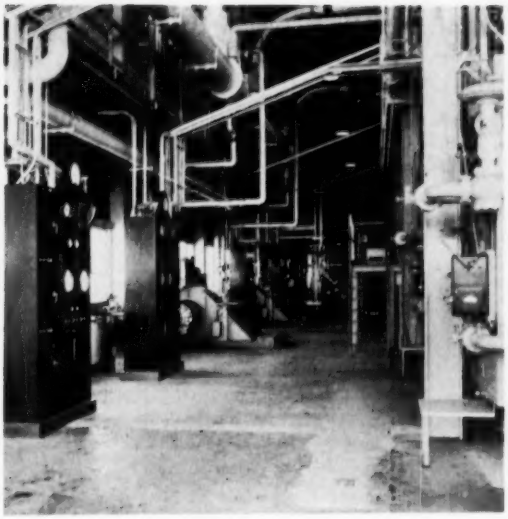
Floor materials were carefully selected. Most of the kitchen areas, where processing is done, have tile floors for low maintenance and easy cleaning. But where corrosion is especially severe, as in the vinegar department, floors are a special hot mastic. Conventional concrete paves floors in preparation areas where there is not too much corrosion. And in warehouse areas where industrial truck traffic is heavy, case-hardened concrete containing iron filings is employed.

Construction of the new one-story, 177x28 ft. administration building is unique and extremely simple. Not only are the outside walls made of blue heat-resistant glass panels in aluminum framing, but the roof overhangs walkways around the structure. And the entire roof is supported by outside columns with their bases on the walkways.

Simplicity of the structure is achieved in large part by housing the air conditioning equipment in a partial basement. Chilled or warmed air is distributed through a duct system under the concrete slab portions of the building. Grilles are built into the window sills on exterior walls. The return air system is unusual in that the exhausts are built as the base for the few fixed partitions.

The ceiling is acoustical tile. For the roof construction, gypsum board on bulb tees, with a poured-in-place gypsum slab was used. The wearing surface is 5-ply roofing topped with gravel.

Sloping toward the center, the roof has drains in strategic positions in partitions.



FIVE CONTROL PANELS serve two packaged boilers and three built-in steam generators in modern power plant. Packaged units involve less investment per horsepower and are more "flexible."

Electrical Services and Lighting

It pays to carefully study the economics of electrical distribution before installing electrical services in a plant, Mr. Dunker points out. With the right system, the minimum amount of copper is used and undesirable voltage drop is avoided. Also important, you provide electrical capacity to handle future loads that may develop.

Heinz engineers carefully planned the 2,000-kva. electrical system at Tracy. They so located substations as to minimize footage of copper needed in the secondary distribution system which takes power to the machines. They put 440 volts on the secondary to save copper, reducing the electrical capital investment by 15 to 20% compared to 220-volt service. The higher the voltage, the smaller the wire needed to carry the same quantity of electricity.

Transformers step voltage down to 110 for lights. Small motors are run off the light circuit. Motor controls operate on 110 volts, from small transformers.

Power is delivered to the main plant substation at 4,160 volts, and is stepped down to 480 volts before it goes to the load-area substations. Power comes through a single meter in the primary circuit.

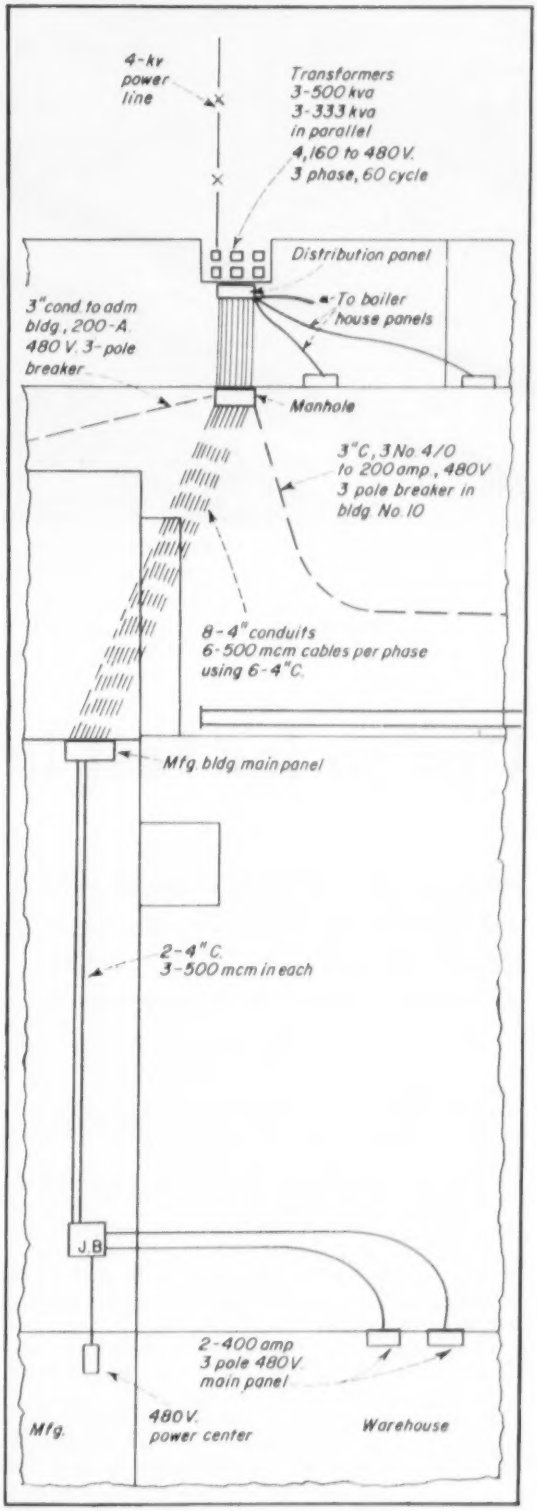
Dry type air-cooled 3-phase transformers were installed to avoid the maintenance and fire hazard problems of the oil-filled units.

Capacitors at terminus of loads correct power factor to keep the electrical rate down. Here Mr. Dunker makes the point that it is not practical to correct power factor to better than 94 or 95%. The cost of going higher results in diminishing returns.

Another bit of advice on electrical efficiency is to carefully calculate the size of each motor required. To over-power is the easy way, but costly.

Heinz uses cable for electrical distribution, except where there is a concentration of motors. Then

(*Turn to page 141*)


4-kv power line
Transformers 3-500 kva 3-333 kva in parallel 4,160 to 480 V. 3 phase, 60 cycle
Distribution panel
To boiler house panels
3" cond to adm bldg., 200-A. 480 V. 3-pole breaker
Manhole
3"C, 3 No. 4/0 to 200 amp., 480V 3 pole breaker in bldg. No. 10
8-4" conduits 6-500 mcm cables per phase using 6-4"C.
Mfg. bldg. main panel
2-4"C. 3-500 mcm in each
J.B.
2-400 amp 3 pole 480 V. main panel
Mfg.
480 V. power center
Warehouse

COPPER IS SAVED by this carefully planned electrical distribution system. High voltage reduces conductor size, and careful location of substations minimizes conductor lengths.

LOOKING TO THE FUTURE, Carnation built into its Seattle plant flexibility, expandability, and architectual beauty comparable with its location in a new shopping center.

Design for Fast In-and-Out Flow

Northwest dairy obviates congestion with traffic pattern that brings raw materials to selected receiving points, conveys finished products to in-place truck-loading areas

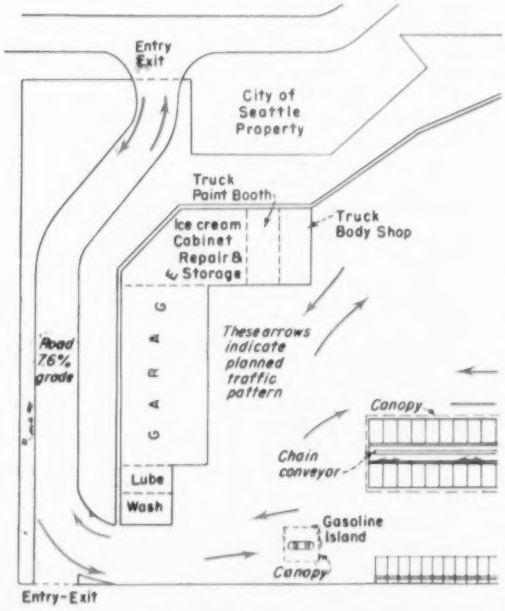
WHEN CARNATION decided to build a new plant in Seattle, its engineers faced a number of challenging new problems.

Foremost among these were: (1) Conditioning the site—a former lake bottom—to support the new plant; (2) designing an unusually attractive building that would fit into the new shopping center of which it was to be a part, and (3) planning the inside layout so as to obtain the maximum public relations returns from advantageous location.

To live up to the company's traditionally high standards, it had to be a model plant. And this is exactly what management wanted—and got.

Its beauty is not merely skin deep. Interior design and construction—even materials used—are as attractive as they are functional. The beautifully appointed 2nd floor hostess room has many features normally found only in private meeting rooms. Its colorful and easy to clean wall coverings are the new plastic Vicratex. And, from its broad windows, visitors can view both milk and ice-cream processing operations being carried out on the floor below.

Other large windows, along the front of the plant,



let passersby as well as visitors see into the ice cream processing room.

From an engineer's viewpoint, efficient arrangement of process equipment and plant services has an equally startling effect. Even the uninitiated, when viewing the plant, get the "feel" of mechanical efficiency and the plant's near-aseptic cleanliness.

This plant was planned for future expansion—not only within its present peripheral walls, but also by knocking-out curtain walls of tile when building expansion is required. Original plans envisioned the addition of other equipment when needed, so space was specially allotted for this purpose.

Selection of Site

The company previously had two plants in Seattle—one for ice cream, the other for milk. Increased population brought greater demand for these products, posing intolerable production problems. This spurred the decision to make a study of the two operations.

Carnation has developed a uniform procedure for such studies. It begins with presentation of the problem to the chief engineer, who then selects, from his staff, a project engineer. The latter, in turn, coordinates the engineering necessary to complete his assignment.

Here, results of the study were compared with other selected company operations. They revealed that considerable savings could be achieved by combining, at one location, the milk and ice cream processing and distributing facilities.

Next step was to ascertain if these plants could be combined at the location of the milk plant.

But due to the limited area (approximately 2 acres) of this plant, such a project was recognized as inordinately costly. Also, the small property size would severely limit future plant expansion. So this plan was discarded in favor of a new site.

Three potential ones were evaluated. The engineering department made detailed comparative estimates of the costs to prepare each considered site for construction of new combination plant.

The sales department people were then brought into the picture. Their major interest was selection of a location that would be central to all city distribution truck routes. Using city maps, sales compared these tentative locations in relation to their routes.

The site chosen was in a new shopping center, and near residential areas. From the standpoint of property preparation, it was the most expensive of the three. However, the lower indicated distribution costs, plus apparent advertising value, were sufficient (approximately $40,000 a year) to offset the additional costs.

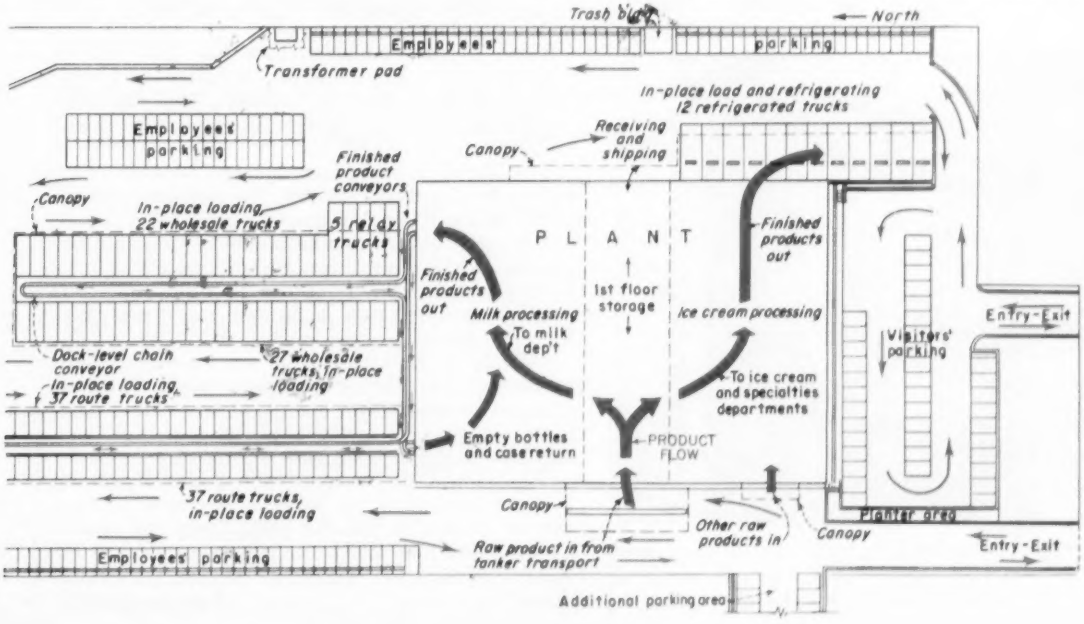
The property was bottom land reclaimed from Lake Washington. It had an overlying layer of peat 15 ft. in depth, and the water table was about 9 in. below ground level. Once the sod was removed, this soil was not firm enough to support equipment of any sort.

Initial calculations called for an average 8 ft. of fill to be applied to the entire area. This would compress the peat layer 5 ft., resulting in a net increase in elevation of 3 ft. To achieve this settlement within a 12 months period, an additional 4 ft. of fill would have to be applied. Then, when the settlement had been achieved, this excess dirt would have to be removed.

Because the fill would not support the weight of the building, plans included the driving of approximately 2,000 piles to a 35 ft. depth for the structure's foundation.

Another major problem was lack of a nearby city

PRODUCTION AND DISTRIBUTION are literally welded together with smooth flow from raw materials to load-out docks. Incoming trucks stop at gasoline island for service, and then park in allotted load-in place. Parking space and directional arrows create a smooth traffic pattern eliminating yard congestion and collisions.



sewer. At first it seemed that the company would have to build a pumping station, since the closest connection available was at a lineal distance of 900 ft., with a vertical lift of approximately 40 ft.

But a happy solution came with the simultaneous development of a nearby shopping center. Its developers, and other businesses and residences in the vicinity, faced the same problem. So they all banded together in an application to the city for establishment of a joint sewer development. This was approved and a city sewer pumping station was installed.

Plant Layout and Construction

The plant is a two-story structure, with offices, hostess room, kitchen, and storage warehouse on the second floor. The entire first floor is devoted to process rooms and services.

The plant depends solely upon truck transport for receipt of its raw materials and distribution of finished products. To avoid traffic congestion arising from milk-tankers and other delivery trucks, the more than 140 route vehicles, and the employees' cars, a traffic pattern and parking area was developed (see accompanying illustration).

The building, except for the curtain-walls is of steel construction with 6-in. concrete fill walls.

Floors are of 3-6 in. concrete slab. In the processing rooms, they are covered with sanitary floor brick; in wash and locker rooms with mosaic tile; and in the lobby, offices, drivers' and hostess rooms with vinyl tile. Warehouses and boiler and compressor rooms have concrete floors.

Walls of the ice cream, mix making, and cottage cheese rooms are ceramic tile to the ceiling, while in the other processing rooms these tiles run up 7 ft. 6 in. from the floors. Refrigerated raw products and milk rooms, bottle washing, and compressor rooms have salt-glazed structural tile to the ceilings.

Walls and floors of refrigerated rooms are insulated with corkboard, ceilings with Styrofoam. All ceilings are of concrete plaster, except in offices, drivers' room, and hostess room, where acoustic tile is employed.

Used on the roof is 3-in. gypsum slab covered with built-up roofing and selected white rock.

Electrical Services

Incoming power from the utility-owned substation on Carnation's property is 23.5kv./4.16kv. to the plant's main substation transformer room, where it is reduced to 480v.

A 5-kv. Neoprene jacketed, insulated cable, in a Transite conduit set in an underground concrete envelope, connects the substation with the one in the plant. A second, identical line was added in case of emergency.

The plant substation is equipped with large air circuit-breakers of the draw-out type. It feeds 9 motor control centers and a group of 5 lighting transformers, each of which is located at strategic usage points.

Motor control centers (electrical panel rooms) have starters and breakers of the plug-in type, stacked 9-high. Yard distribution center is at the northeast dock. This feeds a transformer bank that reduces the 480v. current to 240v. 3-phase for refrigerated truck plug-ins, and also provides 115-230v. single-phase for the lighting circuit illuminating the dock and yard.

Each feeder line to motor control centers is equipped with an ammeter located on the main switch-board in the transformer room so that loads to these can be read.

With the exception of underground connections to motors in the ice cream processing room, flexible armored cable (in overhead aluminum troughs) connects the motor control centers with the main transformers. This eliminated the code requirements for pull-out boxes when electrical metal tubing is used.

Conduits leading to equipment in the milk processing room are installed in a pipe tunnel, except those for the fillers, which are run under conveyors. All wiring in wet areas is a direct burial type, impervious to water. All power feeders were calculated with a maximum of 1% voltage drop.

Plant lighting. Incandescent fixtures, needed because of the 22-ft. height of the processing room's ceilings, were specially designed for this purpose and approved by the Board of Underwriters.

These recessed luminaires have four 500w. globes with Holophane lenses and are ventilated by louvers that release heat into the building's attic. Installed on 20-ft. centers, these provide 36 foot-candles in the working areas.

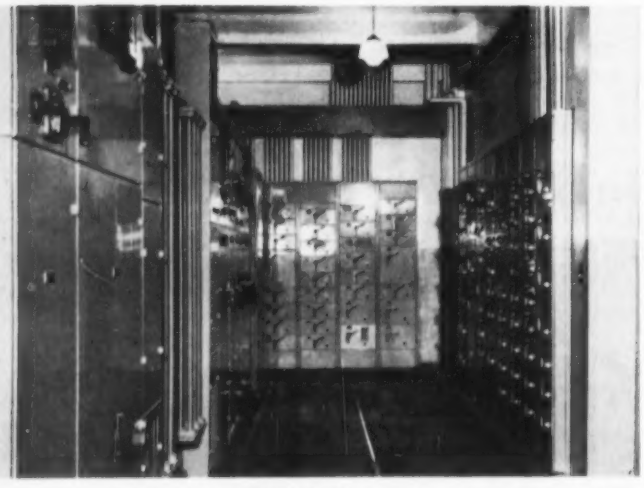
The offices, drivers' room, and two laboratories are lighted by fluorescent fixtures that provide levels of 75-90, 60, and 75-85 foot-candles, respectively.

Vapor type fixtures are used in refrigerated rooms and other areas where humidity is high. Incandescent floodlights illuminate the front of the plant, since the mercury-vapor type used in the yard would not give a true color rendition of the building and its landscaping.

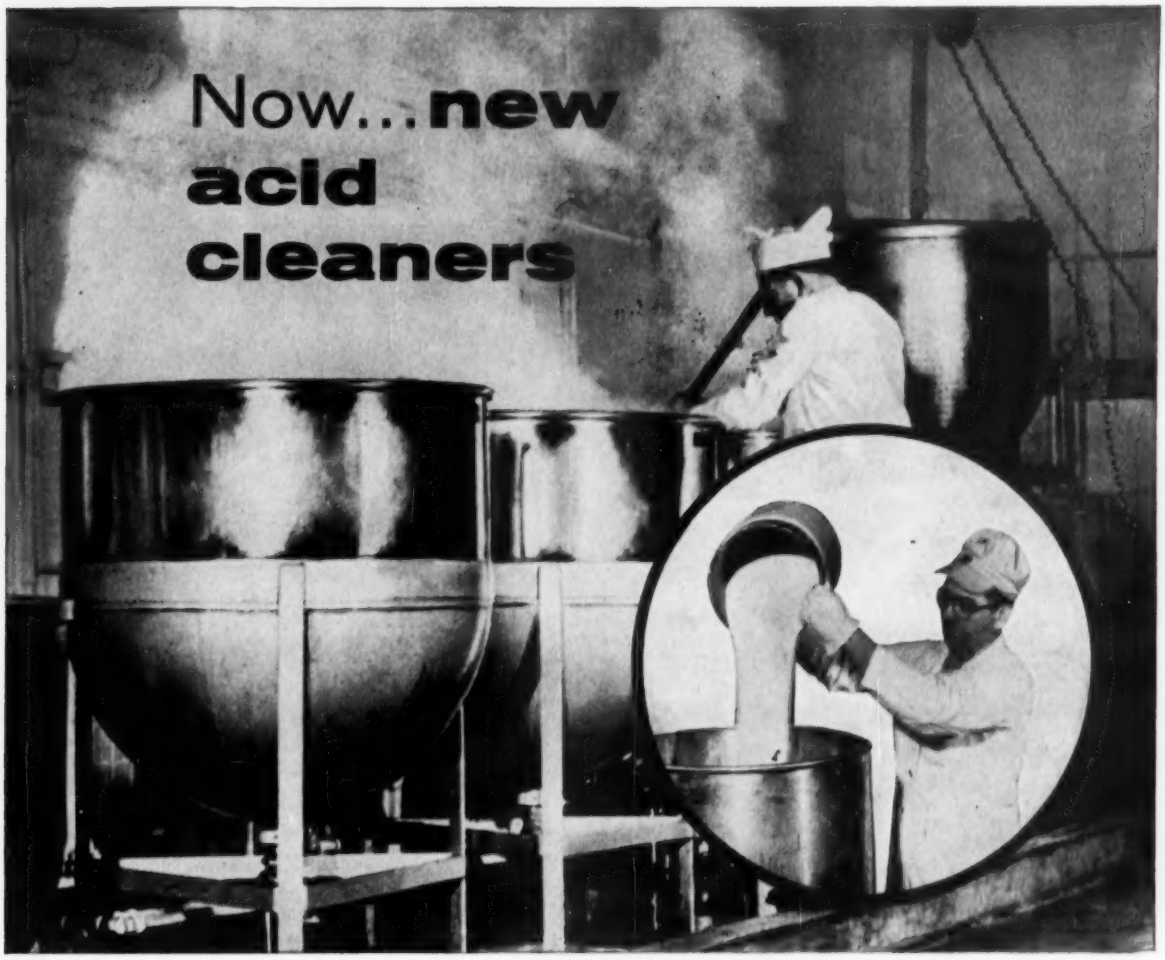
Lighting in the hostess room was carefully planned to provide three different illumination levels. These are achieved by double-strip fluorescent cove-fixture dome lights, and pin-hole spotlights placed in strategic positions for stage and other spot illumination.

This room is also equipped with a central electrical control panel. Here, an operator may open or close window drapes, control the lights, lower the moving picture screen from its recessed ceiling area, control the speaker volume, and operate the moving picture machine.

(*Turn to page 136*)



IN PLANT SUBSTATION, incoming power is stepped down from 4,160v. to 480v. by transformers at left. Motor control panels, with plug-in units, are at rear and right.



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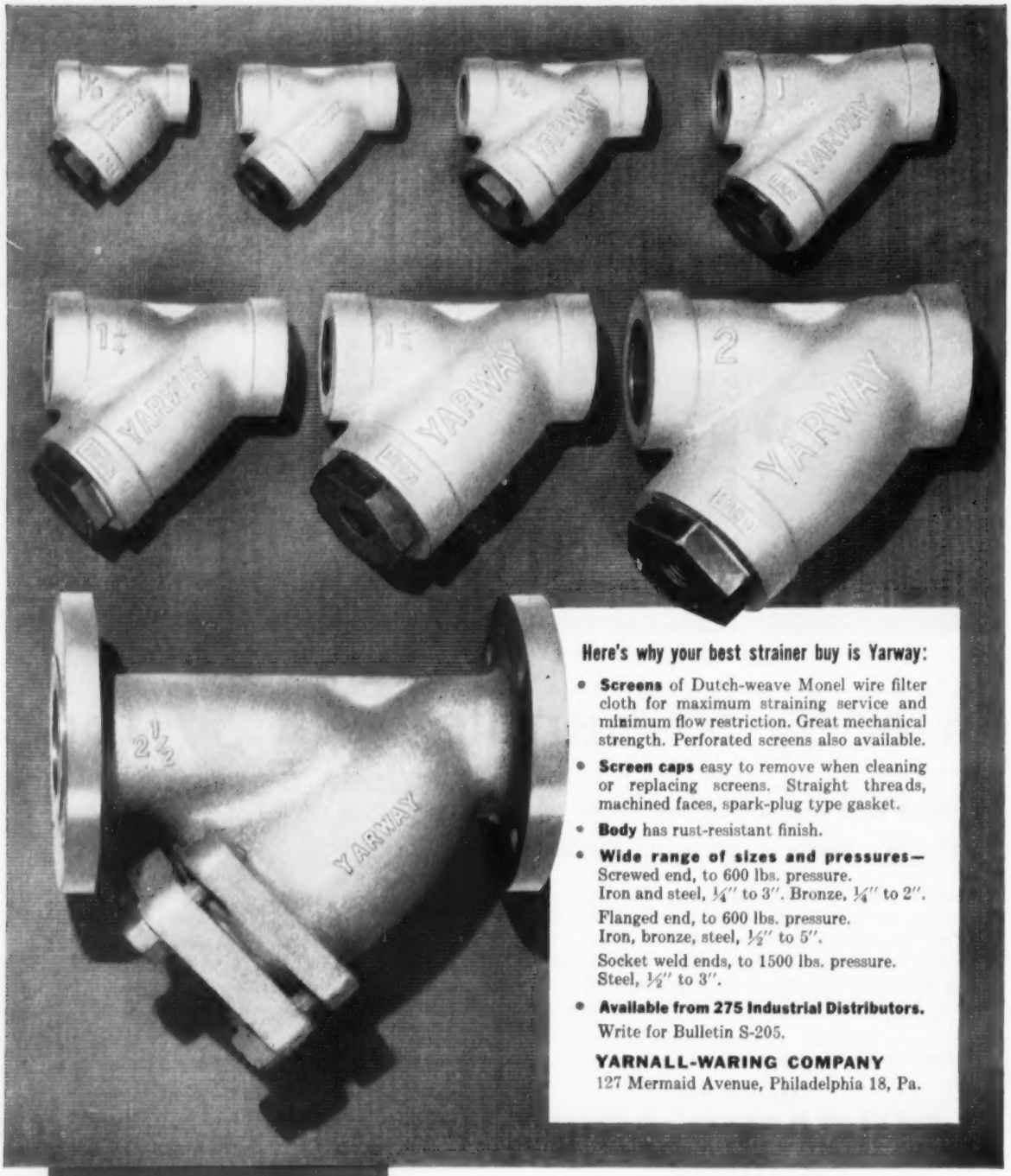

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YARWAY . . . *a good way to specify strainers*

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EXTERIOR OF PLANT is buff face brick with windows of heat-reflecting glass. Enclosed walkway (left) leads to locker rooms, cafeteria, lab, and general offices. There's room for both vertical and horizontal expansion.

Layout That Demand Created

Built where sales dictated, this new meat processing facility may be said to "have everything." Its topnotch engineering is evident in the layout, construction, and provisions for overall economies

THE NEW KEARNY, N. J. PLANT of Van Wagenen & Schickhaus, meat packing firm, is a prime example of advanced engineering in meat packing plant design and construction.

Centrally located for economical distribution of its finished products, this facility has a main highway running past its front door. And at the rear, hog dressing facilities provide the company with its main raw material.

Two sidings connecting with three major railroads, enable receipt of ingredients and supplies in car lots.

Building upkeep has been minimized and sanitation simplified by selection of the most modern construction materials and equipment.

Nor will growing pains bother the company—for ample provision has been made for both vertical and horizontal expansion.

Among the outstanding features of the new plant are:

1. A unique assembly-cooler shipping arrangement.
2. Truck-loading court that accommodates and refrigerates 60 delivery vehicles at one time.
3. New type stainless steel smokehouses with automatically controlled temperature, humidity, and smoke.
4. Complete, new and modern table-ready meats kitchen.
5. A new and modern hog-cutting operation.
6. A new beef specialties cutting facility.
7. Complete employee service facilities, including a well equipped medical department.

Selection of Site

Like many other food processors, Schickhaus was faced with the problem of meeting increasing demand for its products (due to the expanding population of the New York metropolitan area) in its non-expansible Newark, N. J. plant.

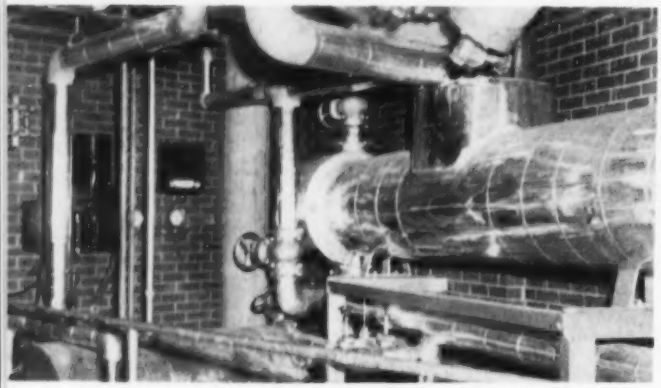
Previously, company activities reached into three plants: Newark, where processing was carried on; a plant of its parent company in Kearny, where hog dressing was performed; and the Swift & Co. Jersey City plant, from which a sales and distribution fleet operated.

All operations are now combined under one roof, and at a location that is practically ideal from the distribution standpoint.

Its capacity, based on 1-shift operation, is approximately 25% greater than the previous setup. The company now employs 700.

Of equal importance was consolidation of all sales

PLANT IS FULL OF SMART EXTRAS, such as this loading court which accommodates and refrigerates 60 trucks at one time. Loads are assembled on skids in shipping cooler, moved to trucks by fork-lifts.



SHELL-AND-TUBE HEAT EXCHANGER on top floor of plant uses exhaust steam, supplies hot (180F.) water to washup centers in processing rooms, and for other uses.

for the New Jersey-New York area in the one plant.

In locating the new plant, management wasn't faced with the usual problem of pinpointing the best spot distribution-wise, and then finding available land as near to this point as possible.

Site of the hog dispatching facility, comprising 20 acres, met this requirement admirably. What's more, it had a power house and adequate maintenance shops.

Another advantage was the fact that present buildings were located on the rear of the plot, leaving the area facing Harrison Ave., a main thoroughfare, available for the new facility.

Electric power was readily available, as was water from the city system, but additional refrigeration was needed. Railroad sidings, served by three major lines, facilitated direct receipt of major ingredients, supplies, and dressed meat not slaughtered on the grounds.

Layout and Construction

The plant is a 3-story, 160,000 sq. ft. reinforced brick and concrete structure. At present, the 3rd floor does not extend over the entire building, but provisions were made for its future expansion.

As approximately two thirds of the production area is under refrigeration, 4 in. of insulation was installed in all outside walls of these areas.

Outside walls are of buff colored face brick. Inside walls have 4-ft.-high wainscoatings of red shale brick above which glazed ceramic tile extends to ceilings. The shale brick is used for wainscoating because it provides greater protection against impact from trucks and other objects than the ceramic tile.

Floors are reinforced concrete slabs with insulation, waterproof membrane, cement base, and floor brick pavers. Ceilings are smooth concrete. Roof is reinforced concrete with insulation, covered with tar and gravel roofing.

There are two covered loading areas—the court for the company's fleet of 60 refrigerated vehicles, and a separate platform for customer's trucks. These areas and the roadways connecting with the street are hard-surfaced. Parking is provided for 350 employees' cars.

The 2-story office building, facing directly on Harrison Ave., is of buff face brick. It has large expanses of glass. Area between office and street is carefully landscaped.

First floor of this 32,000 sq. ft. building is devoted to services. It contains a cafeteria and kitchen, laboratory, three locker rooms, employment, medical, and USDA inspection offices. All floors here, except the laboratory, are terrazzo. Lab floor is vinyl tile. Walls are cream colored glazed tile, to the ceiling.

Stairs, and 2nd floor reception room have terrazzo floors and walls of cement plaster painted brown.

The second floor contains general and private offices, men's and women's cloak rooms and toilets. Floors of offices are greaseproof asphalt, walls are cement plaster painted pastel green, ceilings are acoustical tile in a lighter green shade. Lighting is by flush mounted fluorescents. Walls of halls, cloak rooms and toilets are glazed tile.

For convenience of employees, an enclosed bridge connects 2nd floor of office building with the plant. Thus, it isn't necessary for anyone to go outside to get from one building to another.

Electrical Services

Power is supplied to the company substation at 4,160v.

The substation, which is directly behind the plant, consists of three transformers that reduce power directly to the 550v., 3-phase, utilization current. There is one main switch gear by the station. From it, power feeds to 20 centers located in the various departments of the plant. Lighting transformers (one on each floor) reduce the current to 110/220v., single phase, for use in lighting fixtures and small, single phase, 220v. motors.

Except in low temperature rooms, conduits are buried in the slabs forming the ceilings. Where light of high intensity is required, fluorescents are used. Other areas use incandescent lighting, with vapor type fixtures being used in smokehouses and freezing rooms. Lighting intensity at inspection points is 50 ft.-candles. General illumination is 20 ft.-candles.

Power centers are comprised of magnetic switches sized to fit each motor in the department. A disconnect switch, and start and stop buttons are installed on each machine. Wiring from power centers to motors is in conduits exposed on the ceilings.

Wherever *dependability is demanded*

you find **AQUATOWERS®**

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Reliable refrigeration is essential to profitable food processing; dependable air conditioning is vital to profitable food service. That is why, wherever food is processed or purveyed, you find the water cooling job entrusted to Marley Aquatowers and AquaCoolers in the *majority* of cases.

Marley performance is more dependable (proved in thousands of installations), whether the required gallonage be large or small, because of these exclusive Aquatower or AquaCooler features:

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Contractors, engineers and owners are aware that the best protection of the big investment required by air conditioning and refrigeration is a small investment in a Marley Aquatower or AquaCooler. Only in these Marley towers do you receive positive assurances of maximum economy, long-lived operation and trouble-free performance.

MARLEY

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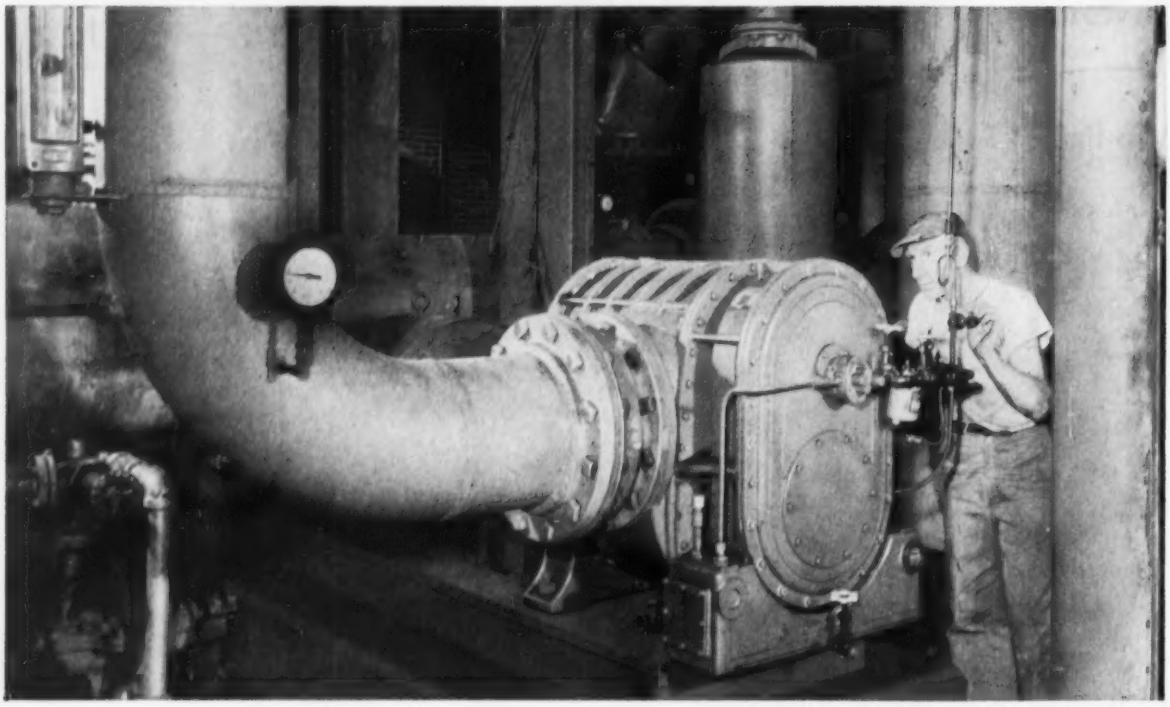
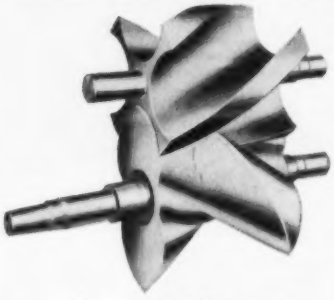
Most compact compressor of its type . . .



AXI-COMPRESSOR in an industrial plant

Use the Axi-compressor*

for pressure and vacuum . . . for air, gases, vapors



Rotors of Axi-Compressor

If you are looking for a compact, efficient source of pressure or vacuum, investigate AXI-COMPRESSORS: they provide greater output per pound of unit. AXI-COMPRESSORS may be operated efficiently over a wide range, with low power consumption.

Rotors are of cycloidal form, screw type. They operate with clearances of a few thousands of an inch, but never touch . . . there's no need for internal lubrication.

Operating advantages of this axial-flow, positive-displacement unit includes the following:

1. Compact, rugged construction
2. Smooth, shockless flow
3. No metal-to-metal contact in compression chamber
4. Operating speeds that permit direct-connected drivers in many cases
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6. Good efficiency over wide range

For complete information on the AXI-COMPRESSOR line for pressures from 25-inch vacuum to 15 psi, capacities from 100 cfm to 15,000 cfm . . . contact your Ingersoll-Rand compressor specialist. Performance curves available in Bulletin 11,001 . . . write for it.

*Axi-compressor

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Power factor is no problem, since current is purchased on a demand basis. To prevent the load from exceeding minimum demand, however, automatic switches are installed on the lines to several motors, causing them to cut off when a certain load is reached.

Sanitation and Waste Disposal

The walls of impervious brick and glazed tile, and floors of brick contribute to easy sanitation.

Dry waste is burned in a special area.

For plant cleanup, hot (180F.) and cold water is piped to special hose stations (minimum, one to a room). Special crews do a thorough cleaning job nightly.

Additional cleaning facilities have been engineered into certain processing equipment. For example, the racks and cages, on which products are smoked, pass through a special cleaning tunnel, where they are sprayed with detergent solution as they are conveyed (over-head monorail) from unloading to loading stations.

Plant Services

All but three of the processing rooms are under refrigeration. Used in them are blast type unit coolers which distribute the cool air uniformly through ceiling ducts.

In rooms held below freezing—particularly for storage of finished products—wall coils are used.

Refrigeration is provided by four compressors—a 350-ton steam-turbine unit, a 115-ton synchronous-motor driven machine, and two horizontal, steam-driven compressors. The latter, used for standby purposes, and are slated for replacement.

Noteworthy is use of a steam turbine to drive the large refrigeration compressor. Steam is fed to it at 150 psi. plus 100-deg. superheat, and exhausted at 15 psi., for use in heating, processing, and heating water in a shell-and-tube exchanger on top floor of the plant. In this way, refrigeration is produced very economically.

The motor-driven machine is employed when the requirement exceeds capacity of the steam-turbine driven unit.

Steam Generation. Four oil-fired built-in type B & W boilers generate steam at 150 psi. Their total horsepower is 2,000. City water used in the boilers is treated.

The offices and medical and employment departments are air conditioned. Used here is a Trane packaged unit. It employs a Freon compressor for cooling the air in summer, and low-pressure steam for heating in winter. Additional heating to compensate for loss through windows is by circulation of hot water from the shell and tube heat exchanger through connectors.

Ventilation of smokehouses and other 2nd floor processing areas is by exhaust stacks in roof of monitors.

Fire Protection. The plant is of fireproof construction, so no sprinklers were installed. However, a complete fire loop, comprised of underground lines and hydrants, was provided. Standpipes are in all vestibules, with hose racks adjacent.

Maintenance Facilities

The plant has a well equipped maintenance shop containing, among other units, machines for sharpening knives, lathes, pipe threaders, and wood working machines. Employed are 15 men, including an instrument man.

Quality Control

The plant has a well equipped, 2,400-sq. ft. research and control laboratory, located on the first floor of the office building.

Here, regular quality tests are performed on the large numbers of product samples which are taken daily in the plant. The lab also checks quality of incoming raw materials and conducts product research.

Statistical quality control is used extensively to guard quality of products, and to control production.

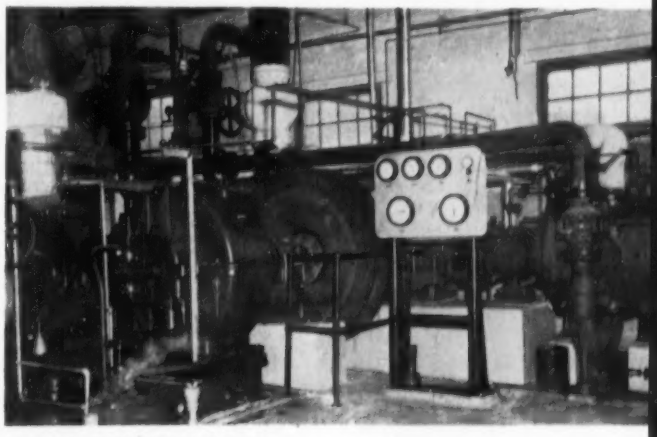
Warehousing and Handling

Salt, the largest non-meat ingredient used, is received in bulk cars and discharged through chutes to leaching beds on the first floor.

Raw meat, whether received in refrigerated cars or from the hog dispatching area at rear of plant, moves directly to coolers on overhead rails.

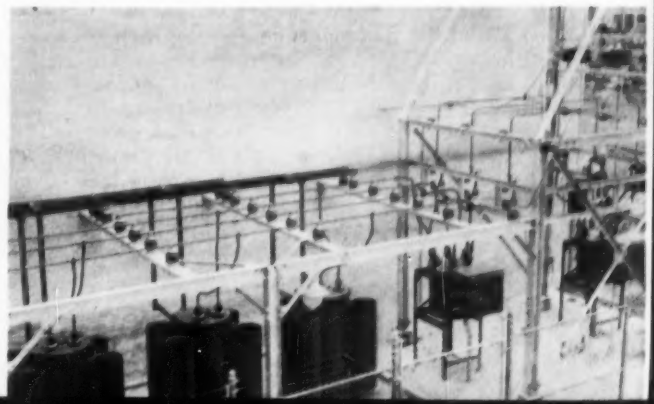
Supplies are transferred from trucks or rail cars onto pallets and moved by fork trucks into special storage rooms.

Cages and trees on rails are largely used to move products during processing. Finished products are handled by power trucks of fork and platform-lift types.



STEAM TURBINE-DRIVEN ammonia compressor is real cost-cutter. It uses high-pressure steam, exhausts it at low pressure for processing and heating.

MODERN HIGH-VOLTAGE SUBSTATION is adjacent to rear of plant. It comprises three 500 kva. transformers that step current down from 4,160v. to 550v. for plant use.



BIRDS-EYE-VIEW of McAfee Candy Co. plant near Macon, Ga. shows how design was varied to meet functions performed in different areas.

Sets Pace With Innovations

New Southern facility incorporates such features as insulated, vapor-sealed rooms. And it uses small package compressors to air-condition large areas

HERE'S A new plant that rates tops in engineering innovations. It's the McAfee Candy Co. facility, 6 miles from its previous home in Macon, Ga.

It is unique construction-wise in that entirely different designs and materials were employed for the different areas—each specifically adapted to the operation performed.

Outstanding here are the processing areas, which are completely enveloped in a vapor barrier to enable maintenance of an extremely low relative humidity.

The newest type of electrical installations with plug-in buss ducts give the company a wide range of versatility.

And the air conditioning system, requiring approximately 300 tons of refrigeration, employs small packaged units redesigned to hold down humidity.

The plant is located on a 50-acre plot that was part of an Army training base in World War II. This area had nine warehouses (9,000 sq. ft. each), paving, sewage disposal facilities, fire hydrants, storm sewers, and railroad sidings.

The new building is 600 ft. long on one side, 540 ft. on the other, by 200 ft. wide. Together with the warehouses, this gives the plant a total of 193,000 sq. ft. available for offices, production areas, and warehousing.

There are parking spaces for at least 200 cars and 50 trucks, and room for doubling present plant size.

Plant Layout and Construction

The plant is divided into a number of areas, each constructed according to specific requirements.

For raw materials, there is a 70x120-ft. storage facility—a Butler rigid-frame building with aluminum roof. It has 14-ft.-high columns and plastic skylights. One side and one end are of metal panels to enable easy expansion. This building adjoins the rail siding on one flank and has a truck unloading platform on the other.

The 140x200-ft. preparing and cooking area has a 100x140-ft. mezzanine. Structure is Butler rigid-frame with multiple 70-ft. spans, 20-ft. columns, and aluminum roof with skylights. There are no windows.

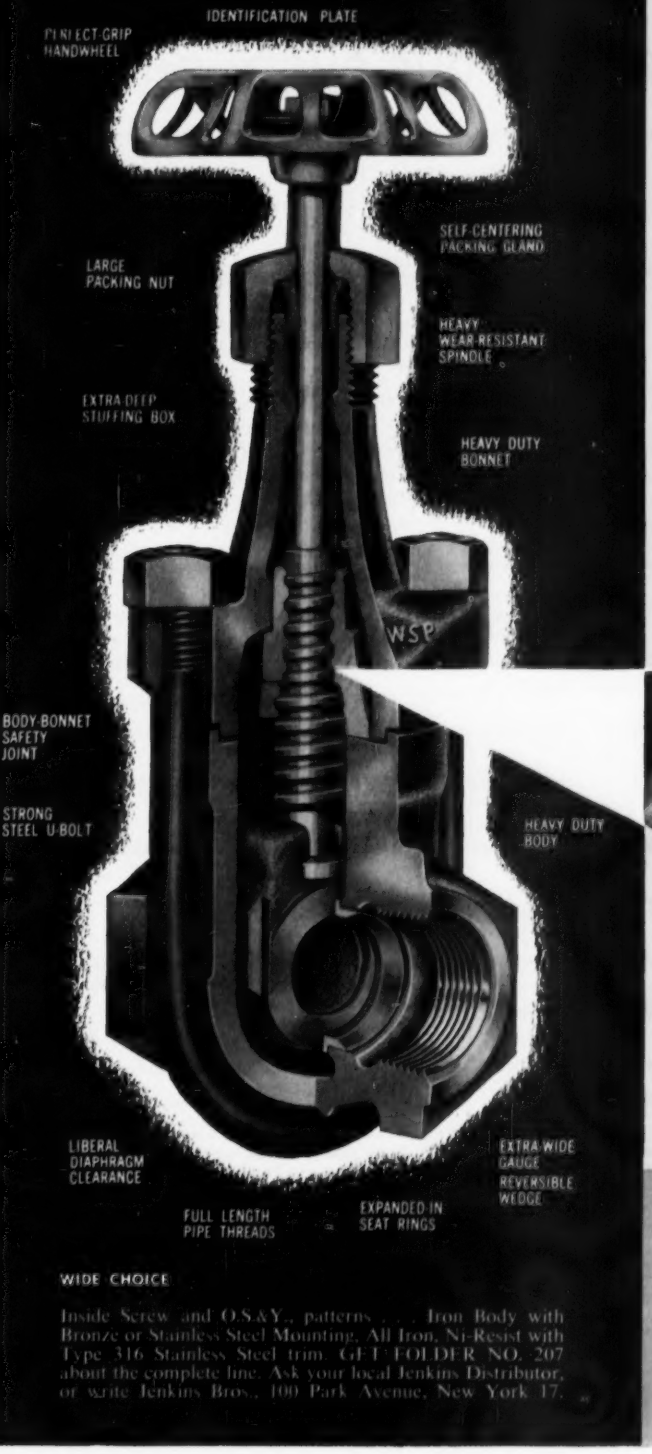
Ventilation is by exhaust fans located in roof peaks, and louvers in the masonry walls. Mezzanine floor is constructed with bar joists and concrete slab. It is designed for 200 lb./sq. ft. in order to take heavy loads.

In the 228x200-ft. processing area, the construction differs. Employed here is a flat roof built of prestressed concrete beams and joists.

Only the big line of

JENKINS U-BOLT GATES

has all these dollar-saving features



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JENKINS VALVES

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a complete line for your every need!

genetron 11—ORANGE LABEL TRICHLOROMONOFLUOROMETHANE	For industrial and commercial refrigeration and air conditioning systems using single or multi-stage centrifugal compressors. Can also be used for either direct or indirect expansion-type systems.
genetron 12—WHITE LABEL DICHLORODIFLUOROMETHANE **genetron 22**—GREEN LABEL MONOCHLORODIFLUOROMETHANE	Used in virtually all types of refrigeration and air conditioning equipment, large and small, household and industrial, direct and indirect expansion systems. Typical units in which "Genetron" 12 and 22 are used: refrigerators, freezers, frozen food lockers, window air conditioners, home or office console units, large custom-built units for commercial comfort or industrial processes, large store units, mobile units for transportation equipment, large home units for addition to present hot air heating systems.
genetron 113—PURPLE LABEL TRICHLOROTRIFLUOROETHANE	Used in 50-ton and larger centrifugal compressors, primarily for large comfort cooling systems, brine cooling systems, and other commercial and industrial air conditioning and refrigeration systems.
genetron 114A—BLUE LABEL DICHLOROTETRAFLUOROETHANE	Used in centrifugal and rotary compressors for commercial, industrial and household refrigeration.

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- Guaranteed exceptionally low moisture content
- Non-corrosive to standard equipment materials
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- Critical and freezing points well outside range of operating uses
- Solvent action on oil helps prevent solidification or congealing of lubricant
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- Aid in lubrication of equipment; generally miscible with oil
- Available everywhere, from refrigeration wholesalers throughout the country

GC Allied Chemical

genetron department

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

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Especially notable is this section's complete vapor seal, achieved with 6-mm.-thick polyethylene. First off, this sheeting was laid on the earth before the concrete floor was placed. Exterior walls consist of 8 in. jumbo bricks, 2x4 stud partitions insulated with mineral wool bats (4-in.) wrapped with aluminum foil. Insulation was stapled to the studs and all joints sealed with a pressure-sensitive tape. The polyethylene sheet from under the floor was lapped and taped to the wall.

The roof consists of 2-in. glass fiber insulation on steel bulb tees which rest on pre-stressed joists spaced on 8-ft. centers. Over the insulation a 2-in. poured-in-place gypsum slab was applied. This was covered with a 20-yr. bonded roof. A strip of polyethylene was used to tie roof and sidewalls together to give a complete vapor seal. All doors are of the regular cold storage type.

The 75x114-ft. office area, contains a reception room, general and private offices, laboratory, clinic, cafeteria, kitchen, locker rooms, and toilets. Aluminum sash, colored stacked brick, and aluminum paneling trimmed with porcelain form the exterior wall.

Floors here are of asphalt tile, while ceilings employ acoustical tile. The kitchen has a quarry tile floor and base, with a 6-ft. wainscoating of ceramic tile. There are four large locker rooms and toilets with ceramic tile floors and 6-ft.-high wainscoatings.

The 70x200-ft. shipping and non-refrigerated candy storage has masonry sidewalls and Butler rigid-frame roof covered with aluminum and having plastic skylights. The west wall contains ten overhead, high-lift doors (10x10-ft.). These have lower paneling of steel. And there is a cam device that assures tight closure.

All floors were placed with a 3,000-lb., 6-bag cement mix and a dust-on type metallic hardener for extra-heavy service. A red pigment was incorporated.

Electrical and Plant Services

The electrical system is 12,000v. primary, 240v. secondary, Star-Delta connections with 3 kva. transformers located outside building walls. These are fed by a 500-amp. weather-proofed feed-in duct.

Plant switchboard consists of one 3,000-amp. automatic circuit breaker with a 75,000-amp. interrupting capacity (operation by buttons). There are also five 600-amp. and four 400-amp. circuit breakers on the switchboard. From here, five lines of 600-amp. buss duct, and one run of 400-amp. buss duct distribute power to the various departments.

Well pump and boiler room distribution is by cable and 4x4 lay-in duct taken off two of the 400-amp. breakers at the switchboard. Lighting system is dry transformer type fed from the buss duct in each department. Wiring system in the office, cooking, and shipping areas is in rigid conduit. In wrapping rooms, Unistrut is used for flexibility.

Lighting is by fluorescent, reflector flood lamps. For work areas intensity is 75-80 ft.-candles, or approximately 3w. per sq. ft. of floor space. Inspection tables are lighted more intensely.

The entire processing area is air conditioned. Used for this purpose are a number of 15-ton Frigidaire package units redesigned to maintain an extremely low relative humidity—approximately 24% at 70-72 deg. F.

Cooking area is ventilated by fans that discharge air through louvers in the roof. Fresh air enters through intake openings in the side of the room.

Steam Generation is by a natural gas fired, 200-hp. Superior package boiler. Heating is also by natural gas.

Water Supply. City water is used for processing and other plant purposes, and for the sprinkler system. A 10-in. deep well supplies 900 gpm. of cool water for the air conditioning.

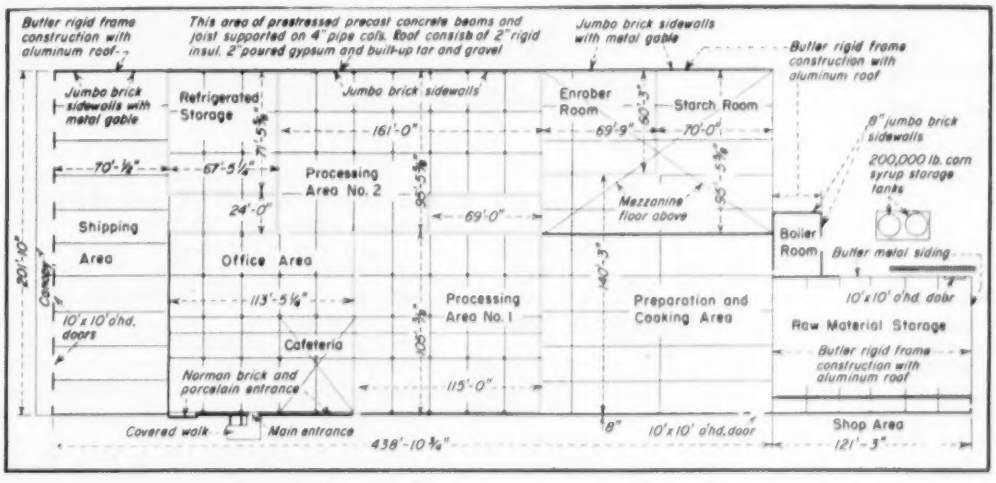
Fire Protection. Entire plant is sprinkler equipped. Also, city hydrants are readily available.

Maintenance Shop has lathe, drill presses, pipe threaders, shaper, milling machine.

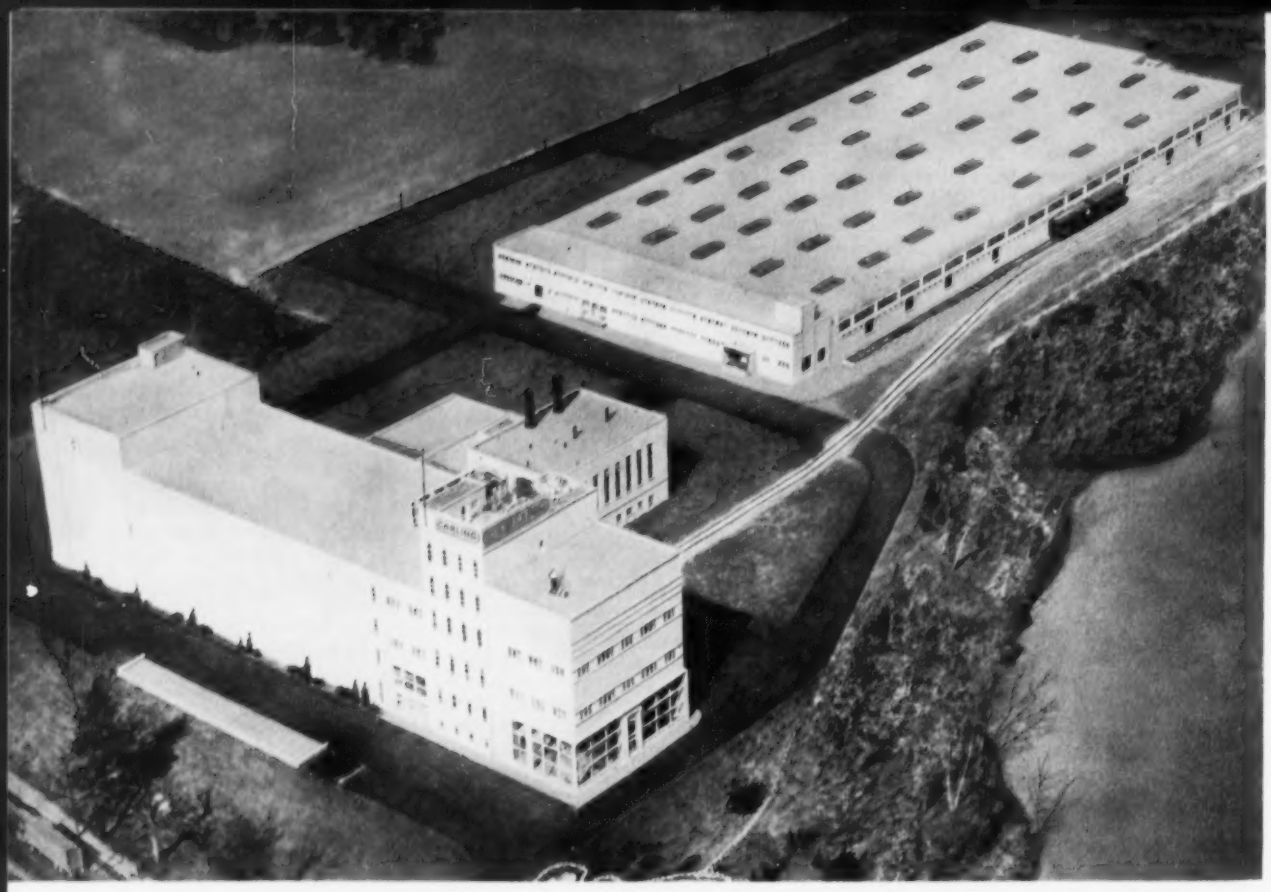
Quality Control and Warehousing

Control of materials and finished products is carried on in the plant lab. Materials arriving in box cars and trucks are fumigated in these vehicles.

Warehouse comprises approximately 15,000 sq. ft. of the new plant plus the nine 9,000-sq.ft. original units. There is also a 6,000-sq. ft. cold storage.


Butler rigid frame construction with aluminum roof
This area of prestressed precast concrete beams and joist supported on 4" pipe cols. Roof consists of 2" rigid insul. 2" poured gypsum and built-up tar and gravel
Jumbo brick sidewalls with metal gable
Butler rigid frame construction with aluminum roof
Jumbo brick sidewalls with metal gable
Refrigerated Storage
Jumbo brick sidewalls
Enrober Room
Starch Room
8" jumbo brick sidewalls
200,000 lb. corn syrup storage tanks
Processing Area No. 2
Mezzanine floor above
Shipping Area
Office Area
Boiler Room
Butler metal siding
Processing Area No. 1
Preparation and Cooking Area
10'x10' o'hd. doors
Raw Material Storage
Cafeteria
Norman brick and porcelain entrance
Butler rigid frame construction with aluminum roof
Covered walk
Main entrance
10'x10' o'hd. door
Shop Area
438'-10¾"
121'-3"

MATERIALS move from raw product storage (right) through processing to shipping (left) in continuous flow. Colored walls designate areas enclosed in vapor barrier envelope.



SITUATED ON A 32-ACRE lake-side tract, the new Carling brewery comprises four units. In foreground is brewhouse, with storage and fermentation building at left. Power house and grain-drying house are in center, with bottle shop and shipping department beyond.

Expansible Multi-Story Facility

New England brewery anticipates future needs with ready-made expansion features that will enable big capacity boost

WHEN THE INCREASING NORTHEASTERN DEMAND for its ale and beer placed too heavy a burden on the Cleveland facility, Carling Brewing Co. surveyed the greater Boston and other New England areas for a suitable new plant location.

Factors considered were: (1) Proximity to existing and future markets; (2) highway and railroad facilties; (3) adequacy of electric power; (4) availability of labor; and (5) abundance of pure water.

Finally selected was Natick, Mass., 18 miles west of Boston, which appeared to meet the necessary requirements. This was a site on three major highways and a trunk rail line. And it offered a fine water supply, obtained from both town wells and Lake Cochituate.

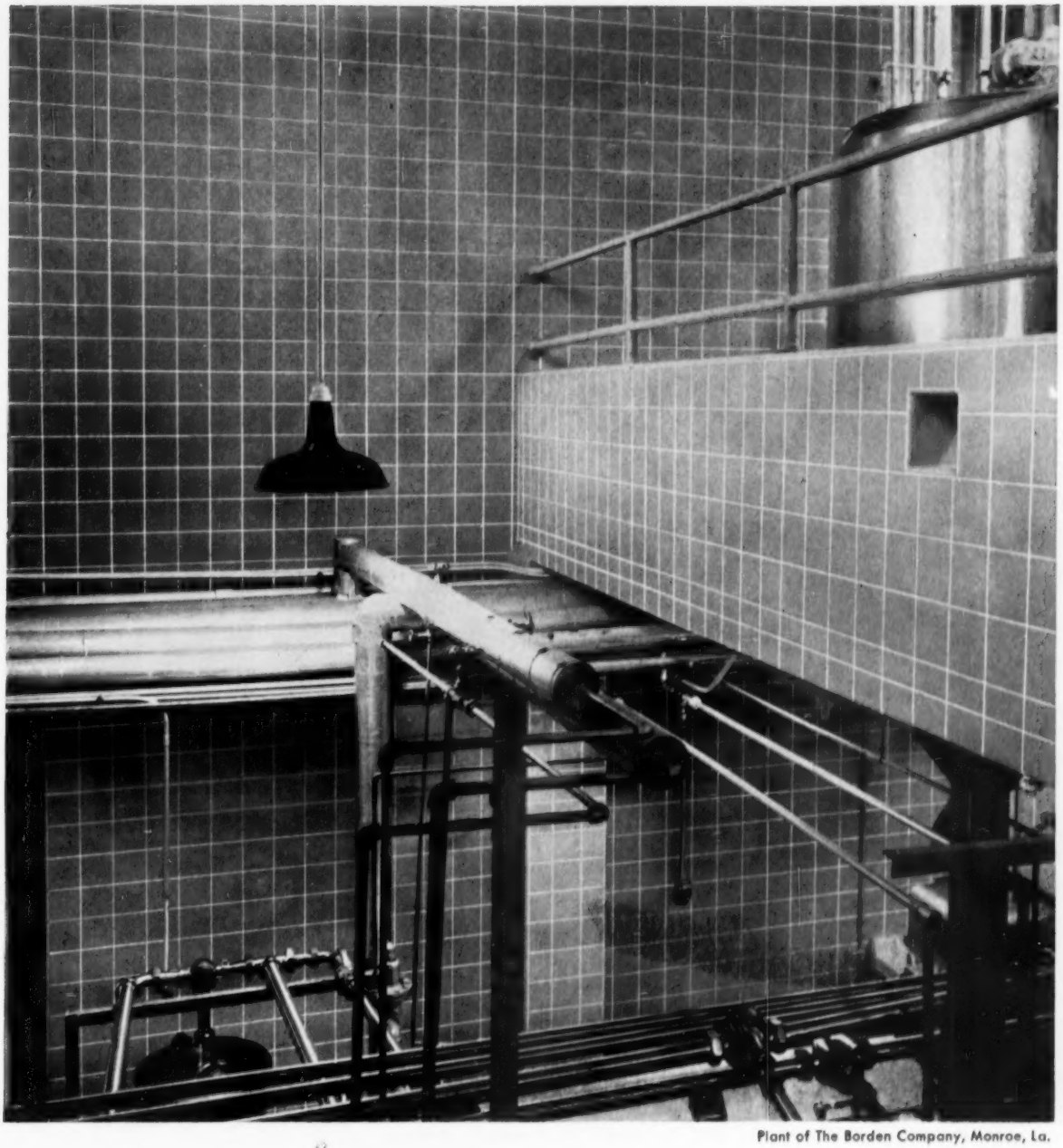
The new brewery is located in a park-like setting on a knoll overlooking the tree-bordered lake. Its four units occupy a small part of the 32-acre tract, leaving ample room for future expansion.

Largest unit of the plant is the 367-ft.-long brewing section. This covers 32,642 sq. ft. It comprises a five-story brewhouse and a four-story fermenting and storage section.

Bottling and shipping facilities are located in a 625x240-ft. single-story structure. A mezzanine houses offices and visitor's balcony. In the cellar are sterilization equipment, washers, pumps, carton assembly area, and bottling tanks.

The power house is 125 ft. long, 80 ft. wide, 40 ft. high. To its rear is a smaller building where spent grain is dried.

In planning for the future, Carling designed the



Plant of The Borden Company, Monroe, La.

Clean bill of health—with lowest maintenance bill

End your concern over clean floors and walls. And at the same time end your worry about maintenance costs—with American-Olean tile.

Ceramic tile is as lovely to look at as it is easy to clean. It's fireproof, vermin-proof, damp-proof, unaffected by disinfectants. And nothing beats glazed tile for low maintenance.*

Why not plan on the permanence and permanent benefits of American-Olean tile? The new, larger sizes cost less than ever to install.

Modern Sanitation Survey.

American Olean

TILE COMPANY

EXECUTIVE OFFICES: 1293 CANNON AVE., LANSDALE, PENNSYLVANIA
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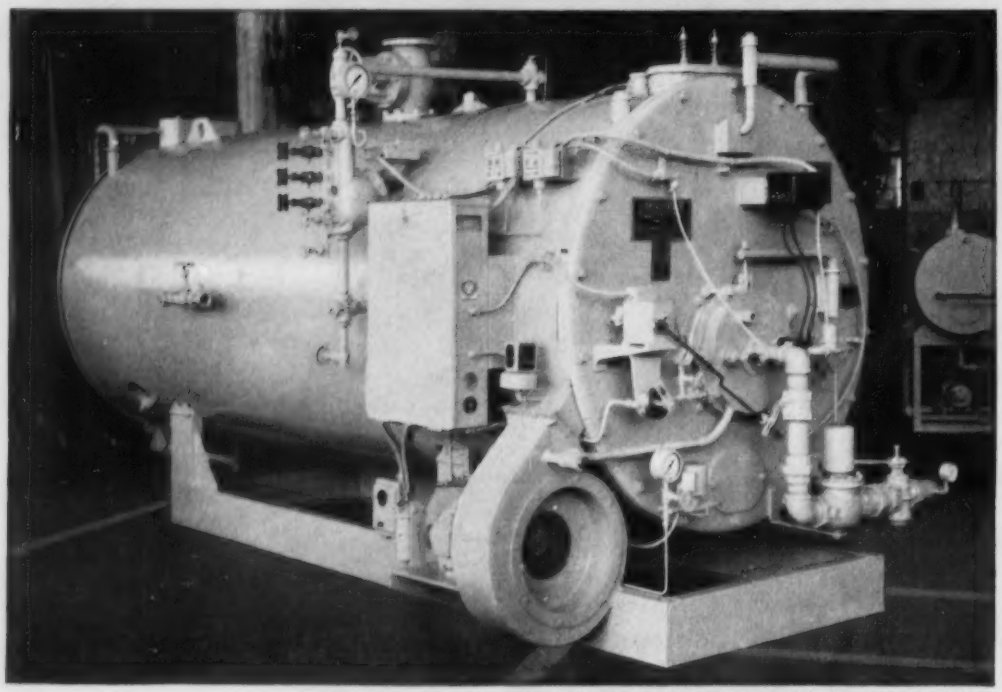
NEW AMESTEAM GENERATOR

MODEL "R"



100 HP Model "R" AMESTEAM GENERATOR

We Kept Our PROVEN DESIGN
We Added "ENGINEERED SIMPLICITY"

Retaining all the time-proven principles and benefits so much in demand in AMESTEAM GENERATORS, the new Model "R" brings you many important improvements.

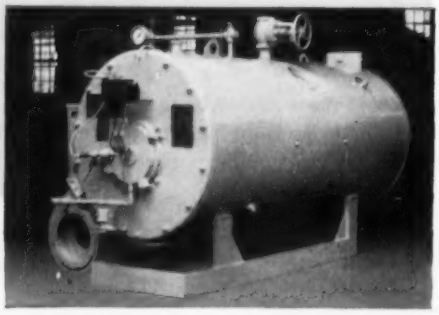
For example, the proven design of the Ames Pressure Vessel is preserved . . . but improved. You'll still find all its reliability, efficiency and simplicity. But, in the Model "R" you'll enjoy these advantages in a much more compact "package" . . . and at a price that will please you.

The Model "R" AMESTEAM GENERATOR is now available in sizes from 10 to 150 HP for pressures up to 250 PSIG, for oil, gas or combination oil-gas firing equipment. Quick fuel switchover is also available. Centrally-positioned auxiliaries and controls simplify your operating procedures.

Like all AMESTEAM GENERATORS, the Model "R" is shipped to you in firing condition, completely inspected and equipped to comply with the local, state or insurance codes specified. All you need to do is connect it up and put it to work.

Investigate the many extra bonus features awaiting you in the new Model "R". Write us today for new Model "R" Bulletin and name of your nearby AMESTEAM representative.

- **SURPRISINGLY COMPACT**
  Saves Floor and Operating Space
- **GUARANTEED 80% EFFICIENCY**
- **CENTRALIZED CONTROLS**
  Save Operating Time
- **NEW FLEXIBILITY OF INSTALLATION**
- **NEW EASE OF MAINTENANCE**
  Conserves Manpower



50 HP Model "R" AMESTEAM GENERATOR

AMES IRON WORKS, INC.

BOX B-107 • OSWEGO, N. Y.

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brewhouse so that its production capacity can be doubled. This area is now occupied by offices.

Also, the bottle house can easily be enlarged to accommodate a fifth filling line by simply knocking out the curtain wall between it and the adjacent store room.

At present, the company employs 250 workers.

Plant Layout and Construction

Landscaping has been extensive, with beautiful trees and lawns setting off the $24 million plant. Added features are the plant-bordered pools and waterfalls produced by the lake water. This water is employed for product cooling within the plant.

Two rail sidings to the west of the bottle shop have space for 20 cars. One of these sidings continues to the brewhouse, where hops and grains are transferred from cars to storage silos.

The five-story brewhouse enables gravity flow of all bulk ingredients. The storage house, connected to it by a narrow annex, contains laboratories, offices, and a reception room.

Buildings are of brick with stone facing on a structural steel frame. Storage house walls have two 2-in. layers of cork with an asphalt seal between. With the exception of the 2-story brew kettle room, which has glazed tile to the ceiling on two walls and an equal height of glass on the other two, walls are plaster. These walls, and all ceilings in processing rooms and bottle shop are painted with a special moisture-and-bacteria resistant coating that presents a ceramic tile-like surface (Rubbertex-Sanitile, Master Mechanics Co., Cleveland).

Floors are of reinforced concrete covered with quarry tile in most production areas and bottle shop. Asphalt and rubber tile, and terrazzo are used in various service areas, such as offices, cafeterias, and washrooms.

Roofs of brew and storage houses are asphalt and gravel. Power house and bottle shop have precast concrete roofs. Shipping section has a gypsum slab roof.

Electrical Services

A 5-unit substation with a total capacity of 32,000 kva., receives power at 13,800v. and distributes it to substations located in the bottle shop, power plant, storage, and brewhouses. Here the voltage is stepped down to 440v. for plant use.

Power Factor. Refrigeration compressors, demanding the largest electrical load, are driven by synchronous motors, which control the power factor in the neighborhood of 0.85.

For lighting, the 440v. current is transformed to 220v. Bottle shop is lighted by continuous line fluorescents, remainder is by incandescent lamps in fixtures.

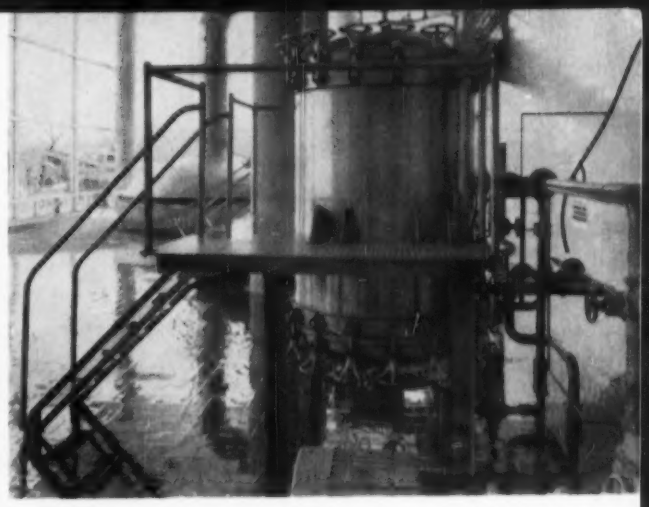
Brew and storage house operating stations are connected by an inter-com system (Executone). The bottle shop, shipping area, mezzanine offices, and container cellar are inter-connected by a special open-and-closed system (Stromberg-Carlson) that permits any station to talk to another, or to the entire network.

Sanitation and Waste Disposal

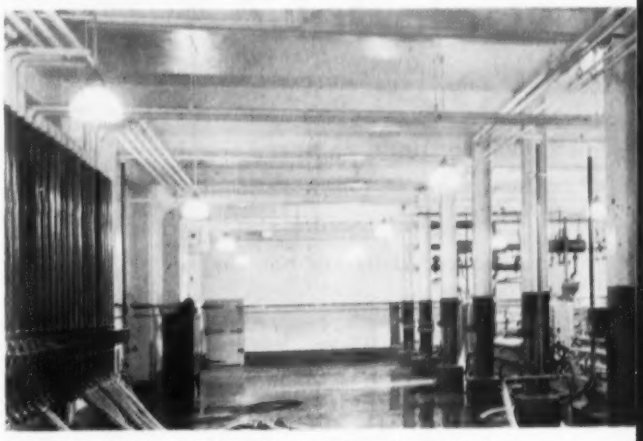
Sewage is pumped to the municipal system. Paper is conveyed to a dumping station. Spent grain is pumped to the dryer house, where it is dried and sold for cattle feed.

In addition to the regular washing procedure, rotary push-type brush cleaners are used on the quarry tile floors.

Industrial vacuum cleaners and hoses are used for cleanup in the brewhouse. Tile drainage aisles in the storage house and bottle shop permit quick washing.



BREWHOUSE is show place with its large expanses of glass on two sides, glazed tile on others. Floor is of quarry tile.



OTHER AREAS, like this carbonation room, have tile floors and walls painted with special moisture—and bacteria-resistant, tile-like coating.

Plant Services

All buildings are connected by a 8x12 ft. tunnel containing piping and electrical distribution. Working and office areas are ventilated by ducts and exhaust fans. In the bottle shop, an air supply system is connected with a Trane unit (installed in the basement) for either heating or cooling. Incoming air to the brewhouse is heated in winter by units installed in fans.

The open fermentation room has an elaborate air filtration system composed of oil-impregnated glass

HANDSOME NEW PLANT of Pepsi-Cola General Bottlers, Chicago, occupies 4 acres of 10-acre plot allowing ample room for expanison. It features mezzanine observation platform for visitors.

Colorful Ad, It's Functional Too

Built for 100% palletized operations, Pepsi's new plant on Chicago's south side combines architectural beauty, easy expansion, and advanced materials handling

IF YOU NEED PROOF that a plant can be both well engineered and beautiful, take a look at the new Pepsi-Cola General Bottlers' plant on Chicago's south side.

Here is a most attractive modern plant of white glazed brick with large picture windows overlooking a park-like expanse of lawn landscaped with trees and shrubs.

Inside are numerous engineering features that point up this company's alertness to advances in its field. Of particular importance are the provisions for future expansion, such as allowing room for an additional bottling line that will increase production capacity by more than 33⅓% without alterations to the building.

SELECTION OF SITE

When increasing demand for its beverage impelled the company, in 1955, to look for larger quarters for its operations on Chicago's south side, it did the logical thing—pinpointed the "sales center" of the area to be serviced.

Then it found a site within a mile of this "center" and proceeded to build a new plant with double the capacity provided by its old facility.

The new one-story building occupies approximately 4 acres of a 10-acre plot. It sits back 125 ft. from the streets, with the areas between professionally landscaped.

To the east of the plant a hard-surfaced parking area accommodates 125 employees' cars.

Plant Layout and Construction

The plant is laid out for efficient handling of raw materials and finished goods. It has a small second-floor occupied by offices.

Provisions for flexibility and expansion include space for an additional bottling line, also arrangements for extension of the warehouse and garage to the north when required.

An outstanding feature is a mezzanine walkway from the lobby. This permits plant tours to be conducted without interfering with operations. From here, the bottling room, processing departments, warehousing area, and garage are all visible.

Outside walls that face the streets are of white glazed brick. Rear walls are common brick. Inside walls of syrup and bottling rooms are of 6- and 8-in. glazed structural tile. Others walls are of 4-in. concrete blocks.

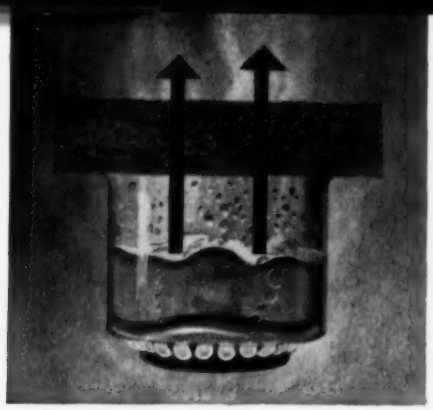
Roof is formed of precast slabs of Federal cement tile with 1½ in. of rigid insulation. Ceilings are accoustical tile or plaster.

Floors are 6-in. reinforced concrete. Syrup and bottling rooms have Furnane floors.

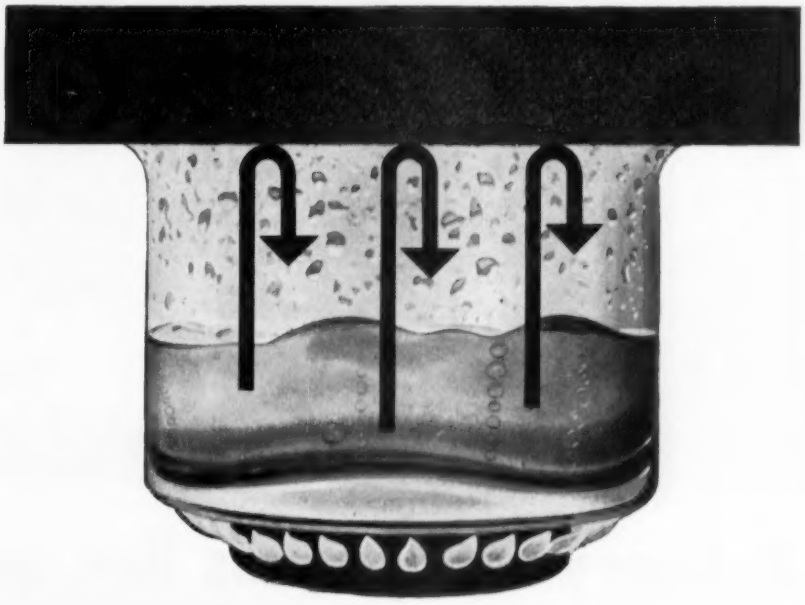
Electrical Services

Secondary service from terminals of the transformer in the substation to the main distribution switchboard is 3-phase 4-wire 480/277v. This switchboard is a dead-front type, free-standing unit consisting of a 1,600 amp., 3-pole main circuit breaker, feeder switch, and fuse units.

Distribution transformers throughout the plant are arranged for 480v. primary. Those for service to motors for bottling units are 3-phase, 4-wire 240/120v.



Some insulations transmit vapor



FOAMGLAS®

INSULATION

is vapor-proof . . .

needs no separate vapor barrier!

—and inorganic FOAMGLAS is dimensionally stable . . . waterproof . . . easily carries loads of 7 tons per sq. ft. . . . can't burn . . . repels all vermin . . . easy, economical to handle and install. Write for detailed literature.

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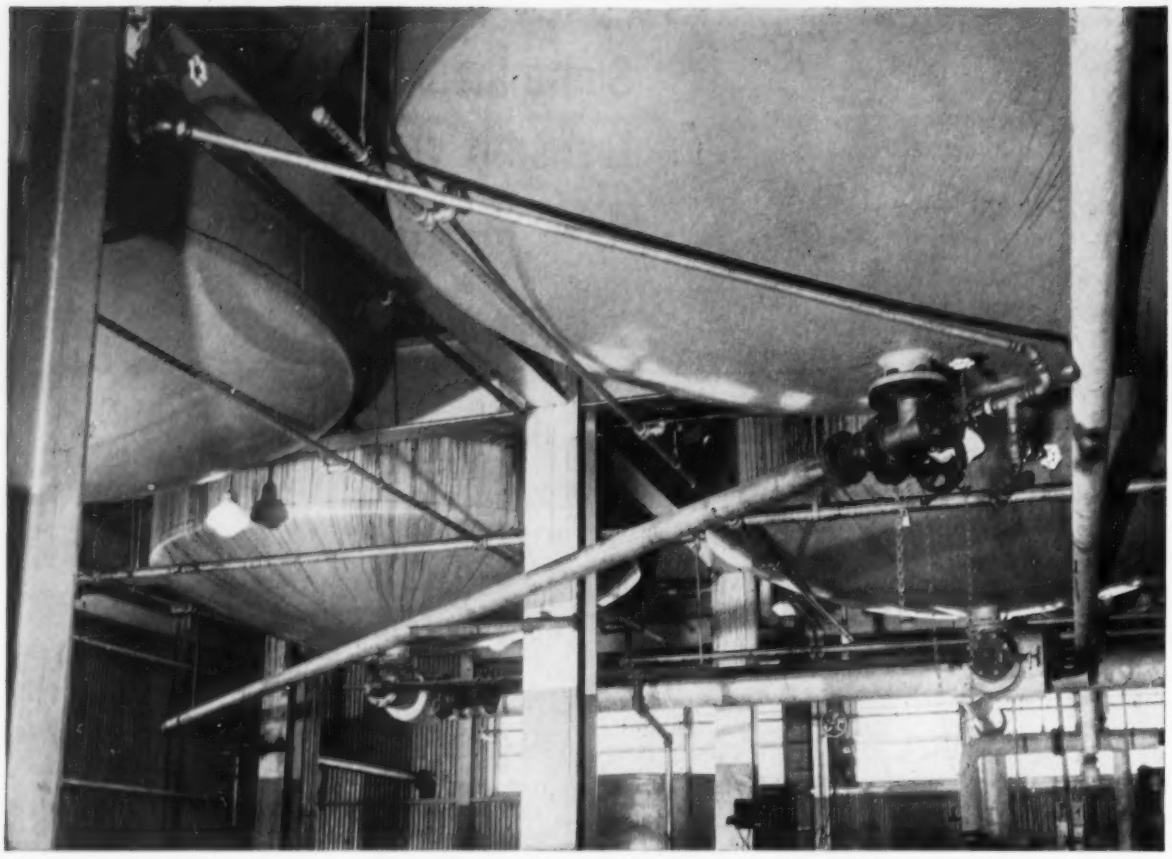


Sugar Refinery cuts process line costs with *Carpenter* Stainless Pipe

Two or three piping breakdowns a year due to corrosion and low temperatures were common before a sugar refinery switched to Carpenter Stainless Pipe for process lines handling liquid sugar. To date, the Carpenter Stainless Pipe has given 4 times the service life of the piping formerly used, with no signs of requiring replacement.

The high strength-weight ratio of stainless permitted using lighter walled pipe which cut fabricating time and cost considerably, and increased flow capacity of the lines. Other advantages the refinery gained include superior sanitation, resistance to corrosive attack at temperatures up to 200°F, abrasion resistance, and substantial savings in replacement down-time and costs.

Perhaps these advantages can help you cut costs and improve product quality. Call your nearest Carpenter Distributor or Branch Office for help and guidance . . . ask for Bulletin T. D. 114.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

more than corrosion resistance

Stainless Tubing & Pipe

Those for lighting are single-phase, 3-wire 240/120v., and 3-phase, 4-wire 208/120v.

Lighting in production areas is by suspended industrial fluorescent fixtures suitable for two 40w. lamps, and designed for 227v. operation. In office areas, flush fixtures designed for 120v. are used.

Degree of illumination is approximately 30 f-c. for offices, 10-15 f-c. for meeting rooms, lobby, and production areas.

Plant Services

Air is supplied to the plant through ventilators equipped with fans, heating coils, filter boxes, and cleanable filters. Exhaust is by powered roof ventilators, through balanced louver dampers operated electrically to control temperature.

Refrigeration for the three Mojonnier Carbo-Coolers is supplied by three Vilter 100-hp. ammonia compressors. These units are large enough to take care of the anticipated 4th bottling line. Condensers are Niagara evaporative type, installed on outside of building.

Two Hasselberg, oil-free air compressors supply the required compressed air.

Steam Generation is by two Scotch marine boilers, each with an equivalent heating capacity of 20,000 sq. ft. L.D.R., burning No. 6 fuel oil, with efficiency better than 80%. These supply low-pressure steam to all booster heating coils and ventilating units.

Water Supply is from a 10-in. city service main that branches to the surge tank, water heater, and domestic cold water supply lines. From the surge tank, a 50-hp. booster pump maintains an 80-lb. pressure on the line supplying the three soaker-washers.

Water for bottling is treated in two Infilco coagulation units that reduce alkalinity, remove suspended matter, and kill organisms.

Fire Protection. An automatic pump with 8-in. suction and 6-in. discharge (capacity 1,000 gal./min.), and complete with manual and automatic controller, supplies the five automatic sprinkler systems. The sprinklers have water flow alarms tied into a centrally located annunciator panel board. In addition, a 50-hp. booster pump in the boiler room starts when the sprinklers go on.

Maintenance Facilities comprise an 1,800-sq. ft. machine and jeep repair shop and a 5,200-sq. ft. truck and beverage cooler paint and repair shop.

Employee Facilities comprise a cafeteria, locker rooms, medical and first aid departments, recreation rooms (1,400 sq. ft.), and uniform service.

Sanitation and Waste Disposal

All floors have above-average pitch to drains, which are supplied in production areas with brackets to retain broken glass and debris. Initially of 3-in. size, the under-floor drains branch into larger ducts (4-in., 6-in., and 8-in.) before discharging to the city sewer.

Plant cleanup after production hours is by a 7-man crew, employing a 24-in.-wide scrubbing machine and hoses with hot and cold water. Numerous hose bibs are located throughout the plant. Concentrate and syrup pipelines are cleaned-in-place, using a 200-gal. portable stainless tank and pumps.

Quality Control

A laboratory of 240 sq. ft. contains equipment for constant checks on syrup and carbonation, bacteria counts on various pieces of equipment (performed daily), checks on clarity, alkalinity, and chlorine content of water.

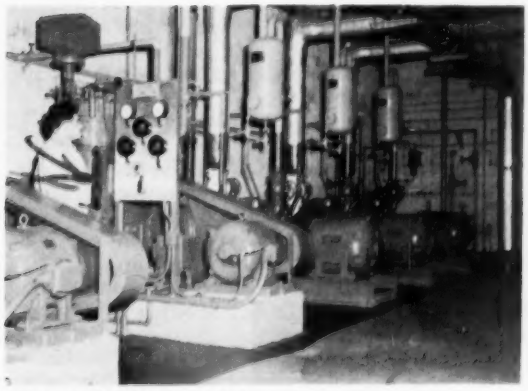
Spot inspections are made throughout the day on washed bottles—to check on their sterility and to detect any evidence of caustic carry-over. Liquid sugar is tested regularly for Brix, clarity, and sterility.

Warehousing and Handling

Storage facilities comprise a 28,800-sq. ft. case area adjacent to the production department, a 1,060-sq. ft. caustic storage room, and a 5,280-sq. ft. sugar storage room.

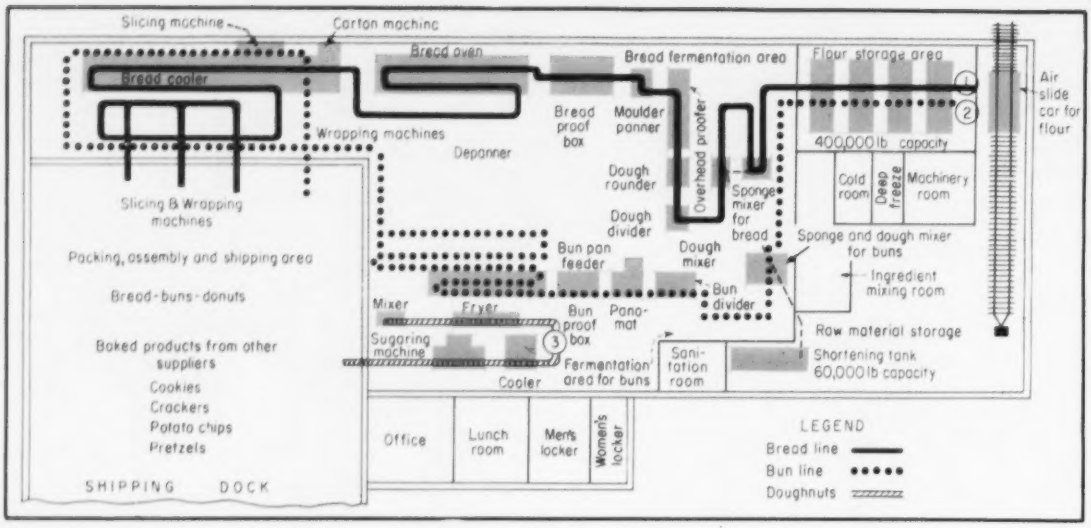
Materials and products are handled on pallets throughout the plant. And pallets serve all company and distributors' trucks.

For handling the loads, 10 lift-trucks (4,000 lb. capacity) are employed. Incoming bottles, crowns, and other supplies are palletized at rear of plant, where four adjustable-level docks permit the lift-trucks to enter trailers.



ENGINE ROOM has 300 tons of refrigeration, three special oil-free air compressors.

GARAGE of 43,000 sq. ft. has space for 100 trucks. Can easily be expanded to north when required.



JEWEL'S three separate production lines enable uninterrupted flow of baked goods from receiving to shipping.

Tailored for Special Job

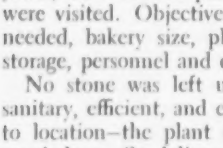
Chain astutely built 1-story, 3-line bakery featuring minimum ceiling height, open fermentation areas, controlled temperature

WHEN JEWEL TEA CO. decided to do its own baking, for its chain of 140 stores in Chicago and the adjoining suburbs, consideration was given to equipping each store with a small baking department.

However, this posed several problems, among them the large capital outlay needed to equip each store, and the necessity for staffing each with experienced bakers.

Smartest idea was to build a completely new centrally located bakery. Since this was a new operation with Jewel, 30 different plants in all parts of the country were visited. Objectives were to determine equipment needed, bakery size, plant cost, and requirements for storage, personnel and deliveries.

No stone was left unturned in building a modern sanitary, efficient, and economical-to-operate bakery. As to location—the plant is almost directly west of Chicago's loop. So delivery trucks don't have to buck city traffic in going north, south, or west.



The building is on the same 52-acre site as the company's brand-new executive offices and huge warehouse. This enabled convenient tie-in of deliveries with the company's warehouse distribution facilities.

Area is professionally landscaped, with an attractive water fountain and pool in the lawn area in front.

A hard-surfaced area adjacent to the bakery provides off-the-street parking for about 150 cars.

The rail siding on the east of the plant accommodates two Airslide cars for unloading bulk flour. Adjacent to it are truck unloading facilities for palletized bags of sugar, nonfat milk solids, etc., as well as bulk shipment of shortening. Westside shipping dock accommodates 8 of the 25 delivery trucks.

Plant Layout and Construction

The single-story fireproof building occupies 65,000 sq. ft., with 35,000 utilized by the bakery proper. Remaining space is devoted to assembly and employee facilities. The bakery has straight-through operation, with raw materials coming in on east side and finished cased goods ending up in the packing, assembling, and shipping area on the west.

Production has been set up for annual output of 12 million loaves of bread, 3½ million dozen rolls and buns, and 1¼ million dozen of doughnuts on a one-shift basis. It can be stepped up, of course, by adding more shifts. And there's room for plant expansion.

There are two non-enclosed fermentation areas—one for bread and the other for bun and roll doughs.

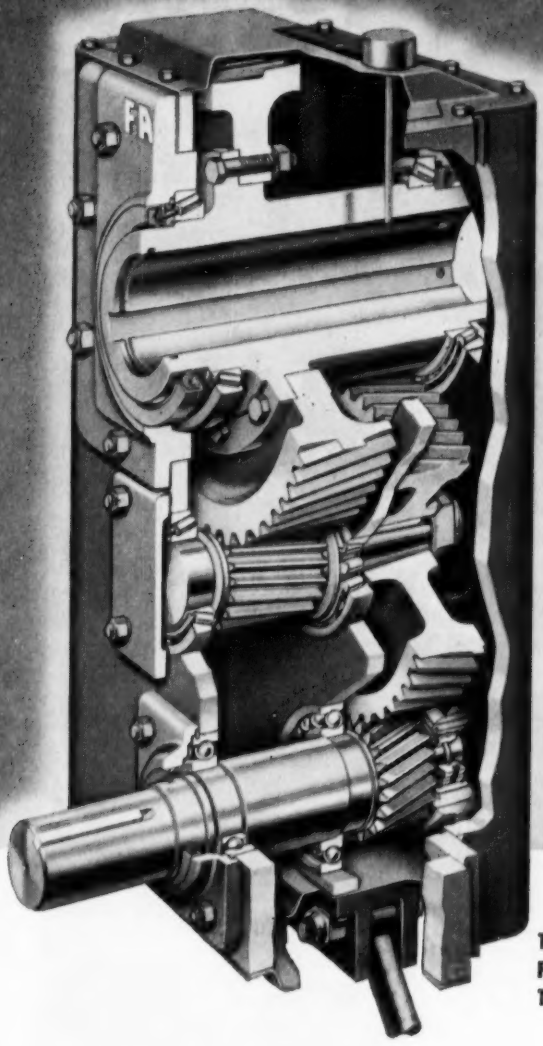
A separate scaling room, adjacent to dough-mixing area, confines dusty conditions resulting from weighing of dry ingredients.

Noteworthy, too, is the centrally located production office (15x28 ft.). Set at mezzanine level, this facility features picture windows. Thus, the plant manager, production superintendent, and chief engineer can easily

New...LARGER...ALL-STEEL!

-the FALK 315J Shaft Mounted Drive

- **for higher horsepower**
- **for lower output speeds**



THE NEW 315J...
FROM 2 HP AT 5 RPM
TO 50 HP AT 359 RPM

Check These Features

New — 3-wall, one-piece housing provides double the ability of cast iron to withstand external impact or shock loads.

New — ratio range—5:1, 14:1 or 25:1. Higher ratio range makes possible lower output speeds...smaller sheaves...standard, rather than slow-speed, motor.

New — ease of maintenance. All revolving elements can be easily replaced in the field, on the jobsite! Inspection covers permit quick inspection of gears and bearings. Dipstick provides quick check on lubricant.

New — longer center distance between shafts allows use of larger sheave on input shaft. Unit may be mounted with input shaft next to driven machine, and with motor mounted directly under driven shaft.

PROMPT DELIVERY

Standard units are available for off-the-shelf shipment from factory, warehouse or distributor stock.

LET US HELP YOU

Your Falk Representative or Authorized Falk Distributor will gladly review your applications and offer suggested selections—without obligation.

Write for Bulletin 7100

The new Falk 315J also gives you these famous Falk advantages—

- Falk extra-depth, extra-capacity gear teeth—plus the extra efficiency (98½% per gear mesh) of helical gears for maximum power utilization.
- Through-hollow shaft design for easy installation, with internal groove to permit use of bearing puller when dismounting unit. Hollow shaft also permits use of unit on through-shaft applications.
- Tie rod fastened to steel housing by steel bracket with bolt in double shear. Shock load on tie rod will not damage housing.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

Representatives and Distributors in Most Principal Cities

Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

FALK

...a good name in industry

ARMOUR and COMPANY among scores of food and packing plants handling waste materials with...

THE DEMPSTER DUMPSTER® SYSTEM

Also noted for its plant-wide cleanliness and sanitation, Armour and Company handles bulk materials at its Fort Worth operation with the aid of Dempster-Dumpster System. In addition to the fire hazards, the unsanitary waste material accumulation and collection with conventional methods, the high cost of handling constitutes a further problem for most manufacturers. Thousands of users like Armour and Company have found the Dempster-Dumpster System helps to solve all of these problems. Above you see how each big Dempster-Dumpster Detachable Container is serviced by the truck-mounted Dempster-Dumpster, operated by only one man, the driver. At right you see other collection jobs handled at the Armour plant by a few of the hundreds of different designs and sizes of containers available. There is a Dempster-Dumpster Detachable Container available or that can be built to suit the material — be it solid, liquid, dusty, combustible, high temperature . . . waste or salvable, raw or finished product, and each, regardless of size up to 21 cu. yds. or capacity up to and over 36,000 lbs. payload, can be handled by one truck-mounted Dempster-Dumpster with only one man, the driver! Savings are tremendous! Write us today for complete information. *Manufactured by Dempster Brothers, Inc.*

successfully exploring new ideas to reduce your materials handling costs with the..... DEMPSTER DUMPSTER® SYSTEM

DEMPSTER BROTHERS, 7107 Shea Bldg., Knoxville 17, Tenn.

oversee most of the key operations.

Floors in production areas are of red split brick. In the areas for storing flour and raw materials, and in shipping areas, floors are of concrete.

Outside walls are of plain brick followed with cinder blocks. Inside walls in production sections are of green glazed tile. In other areas, they are of cinder block coated with several layers of fungicidal paint.

Roof is the flat type with several layers of asphalt paper and top-coated with pebbles.

PLANT SERVICES

The entire bakery is temperature-controlled at 80 F. Air is ceiling exhausted, and there are a dozen louvers (with filters) along the north wall of the plant. Office areas are air conditioned.

The machinery room is located between flour storage and receiving areas. And adjacent to this room is an ingredient cold storage area and a freezing room. Installed in the machinery room are two 25-ton Freon-refrigerated compressors and a 400-gal. water cooler.

Electrical Services. Incoming power lines are 440v., 3-phase, 60-cycle. Lighting is by suspended, 40-w. fluorescent fixtures.

Steam Generation. Steam is piped from the nearby warehouse. For heating, overhead fan-type units are employed throughout.

Plant Cleanup. Operators are responsible for cleaning their equipment at the end of the work shift. An evening 5-man crew hoses down and mops up other areas.

Fire Protection. Entire building is fireproof. Wall supported are eight fire hoses, and automatic sprinklers are installed throughout. The doughnut fryer is equipped with an automatic CO_2 extinguishing unit and other CO_2 extinguishers are spotted throughout the plant. Gas-fired ovens are equipped with automatic safety devices.

Maintenance Facilities. Bakery equipment repairs are made in a well-equipped shop adjacent to the shipping area.

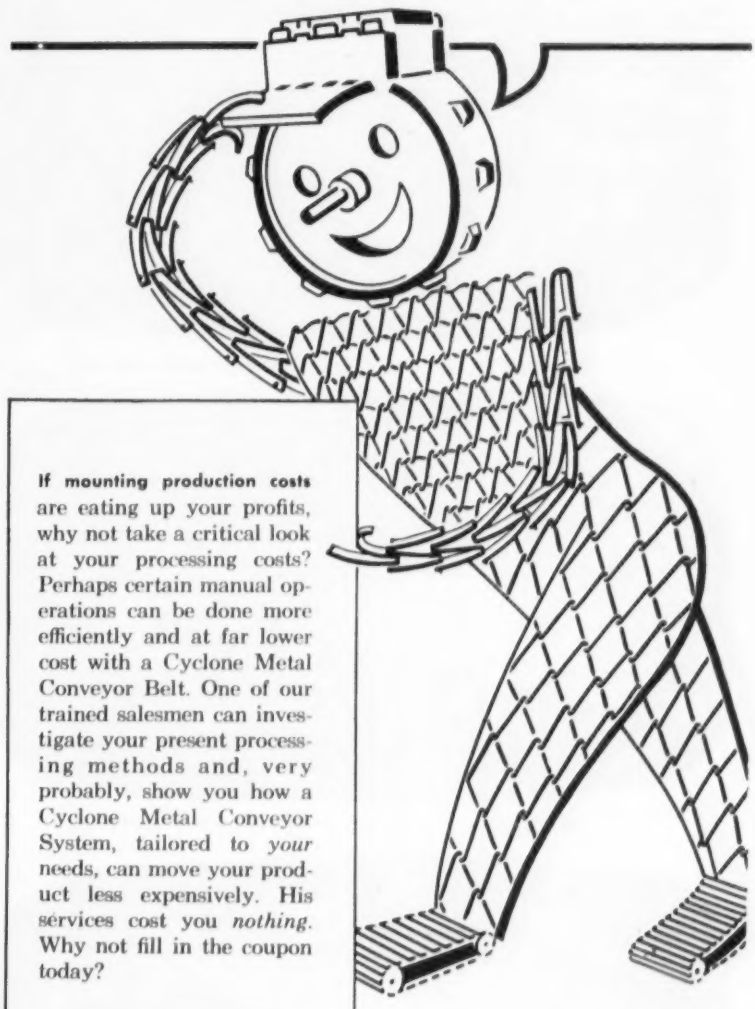
Quality Control. Specs have been set up for incoming raw materials, which are checked by the bakery lab. Here, ingredients are tested by analytical and bake test methods. Samples are further checked by an outside laboratory.

SANITATION & WAREHOUSING

Floors and walls are of tile, and equipment is designed to allow easy access for cleaning and for prevent-

CY BELT says

"I can move and process it for you cheaper!"



If mounting production costs are eating up your profits, why not take a critical look at your processing costs? Perhaps certain manual operations can be done more efficiently and at far lower cost with a Cyclone Metal Conveyor Belt. One of our trained salesmen can investigate your present processing methods and, very probably, show you how a Cyclone Metal Conveyor System, tailored to *your* needs, can move your product less expensively. His services cost you *nothing*. Why not fill in the coupon today?

CYCLONE FENCE DEPARTMENT
American Steel & Wire Division
United States Steel Corporation, Waukegan, Illinois
United States Steel Export Company, New York

USS

USS CYCLONE METAL CONVEYOR BELTS
SPIRAL WOVEN
FLAT WIRE · FLEX-GRID

MAIL THIS COUPON

Cyclone Fence
Dept. H-107, Waukegan, Illinois

Please have your trained representative call on us to discuss our production problems.

Name .....

Company .....

Address .....

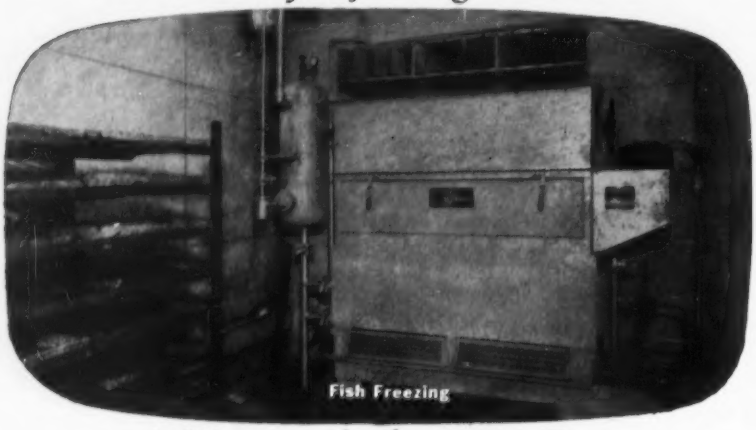
City ..... State .....

UNITED STATES STEEL

NIAGARA "NO FROST"

25 Years' Successful Experience

★ *Never any defrosting shutdown*

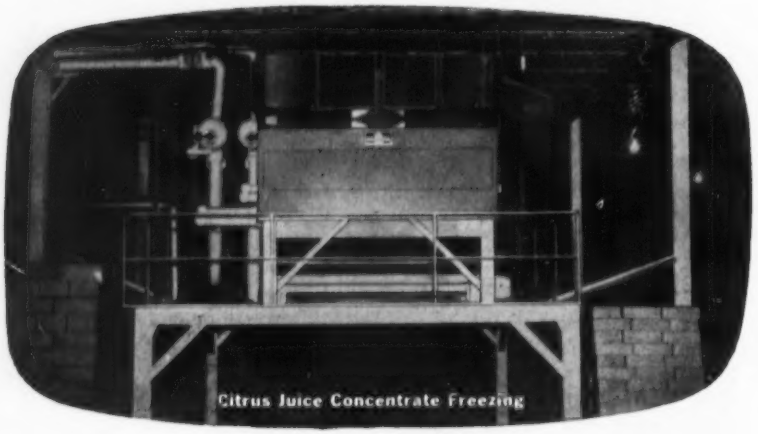


Fish Freezing

★ *Never a rise in temperature*

Vegetable Freezing

★ *Save Power... Reduce Costs*



Citrus Juice Concentrate Freezing

Write for Niagara Bulletin 105

NIAGARA BLOWER COMPANY

Dept. FI-10, 405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada

ing accumulation of flour and dust. Pneumatic systems for handling flour and bulk shortening were installed for sanitary reasons.

Bread cooler is equipped with automatic spray-type washers. At the end of each week, the cleaning unit is turned on to wash the trays as they pass through the system. Air and vacuum lines are employed by workers to clean equipment.

After panned loaves are transferred from cabinet proofer to oven, empty racks are railed through washer (Erko Steel, Inc.) to molder-panner.

Dry wastes are burned in an adjacent field. Dough mixing and fermentation areas have drains, hence are slightly pitched for run-off following hosing down.

Shortening is received by tank truck and pumped into two 30,000-gal. tanks with facilities for nitrogen blanketing (Liquimatic Co.).

Flour comes in by Airslide cars, which are emptied at a 10-ton-per-hr. rate by a Fuller pneumatic system. Flour is stored in four 100,000 horizontal bins (Day). It is discharged from bins by 8-in. screws, then air-impelled through sifter to scale hoppers.

Horizontal bins were selected to save on building construction, which would be excessive with 60 to 70-ft. high silos. Flour-storage area (38x50 ft.) is at ground level, whereas the rest of the bakery is 4 ft. higher.

—*End*

Design for Fast Flow

—*Continued from page 112*

The plant-communication system consists of two intercoms and a telephone Auto-Call signal system. One intercom serves the shipping dock from the order desk. The other is used between the milk vault and refrigerated sharp-storage rooms for both order and inventory purposes.

The recirculating ammonia system provides refrigeration for chilled water (35F); cold rooms and Pure-Pak fillers (12F.); ice cream freezers and hardening rooms (−35F).

Refrigeration (approximately 567 tons) is provided by two 16- and three 8-cylinder York compressors, aided by 2 Fuller rotary boosters. Hardening rooms are cooled by King units, milk vault by Kramer units.

Water Systems. There are three water systems—city, cooling tower, and chilled. City mains are equipped with back-flow preventers instead of vacuum-breakers, to eliminate need for pumps. Pressure of 125 psi. is reduced to 60 psi. for plant use. Flow

of tower water (75F.) can run to 600 gpm., that of chilled water (34F.) to 1,050 gpm.

Steam Generation. Process and heating steam is generated by two package-type, 16,000-lb./hr. boilers at 150 psi. The nearly closed system gives 65-100% condensate return.

Office and processing areas are heated and ventilated by five central systems. Unit heaters are used for other areas. In processing and cottage cheese rooms, stainless air diffusers are used to obviate corrosion.

Fire Protection. Being a completely fireproof building, no sprinklers are required. However, special areas such as the hostess room, kitchen, lounges, and drivers rooms are protected by an ADT system, and chemical extinguishers are located throughout the plant.

Maintenance. The fully equipped shop is located between milk and ice cream process rooms, and adjacent to compressor and boiler rooms.

Employee Facilities. In addition to the hostess room and its kitchen, there are three lunchrooms each equipped with hot plates, refrigerator and storage cabinets. An innovation is the system used to exhaust air from employees' lockers, which also dries moist clothing, removes odors.

Quality Control. There are two laboratories. Principal one is adjacent to front lobby. Other lab is just off the milk processing room.

SANITATION & WAREHOUSING

Floor drains are placed on approximately 20-ft. centers. All sanitary piping is divided into CIP circuits.

Warehousing. The plant has two warehouses: One on the 2nd floor for bulk storage, another on the 1st that provides a daily supply. A conveyor-elevator at the east side moves dry materials to the upper warehouse. Then it continues to the 1st floor, making possible receipt and delivery to storage on this floor. A freight elevator also serves the 2nd floor.

Materials Handling. Liquid supplies are stored in tanks on the 2nd floor. From here they are pumped to discharge points in the process. Wherever required, these lines are traced" with soil-cable and insulated.

For flexibility as well as space savings, all conveyors between ice cream freezers and hardening rooms are mobile, and stored in closets opening into freezer room. Three sets of conveyors move soft ice cream into the hardening rooms, and three parallel sets discharge hardened products to waiting refrigerated truck.

End (Resume reading on page 115)

"individually engineered"

TO TAKE HARD KNOCKS

"Individually Engineered" Furnane Floors are a new concept in corrosion-proof floor installation . . . a patented method of floor construction designed specifically for each type of food processing operation.

An integral part of this concept is the use of 6x6x1 3/8" tile, a new size pioneered by Atlas. No one thickness of floor can withstand all the varying physical and corrosive conditions found within the Food Industry.

Now, for the first time, a complete range of floor sizes are available to meet greater temperature fluctuations and physical abuse while providing the traditional 6x6" floor pattern. These sizes combined with the well known and respected principles of Furnane Floor Construction satisfy the most stringent demands.

See the "Yellow Pages" of the directory for your local representative.

For complete information, write for your copy of "Food Floor Facts."

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

For more data, circle this page number on card at back →

Oakite Hot-Spray Unit. Mobile, self-contained unit for applying hot cleaning solution under pressure, where steam is not available or desirable. Consists of 55 gal. solution tank, 50 ft. solution hose, motor, pump, spray gun and extension, spray nozzles. Electrically powered, gives pressures to 75 lbs. Covers up to 400 sq. ft. per minute.

"That Hot-Spray does a sweet clean-up job!"

—Michigan meat packer. From two men, two hours per smokehouse . . . to one man, forty minutes. That's the difference before and after using the Oakite Hot-Spray Unit.

"Gets used all over the plant."

—California fish packer. Stripping of fish-holding tanks by power buffing was a full day's work. The Hot-Spray knocks off the job in just over an hour.

"We rate it a great time saver."

—Georgia candy manufacturer. Removing a thick coat of syrup fumes from a concrete ceiling took ten men eight hours. Using the Hot-Spray Unit, one man spraying and two men rinsing, the *entire plant* was cleaned up in seven hours.

That's how the reports read. Try the Oakite Hot-Spray Unit . . . and next thing you know it's indispensable. Figure the time saved . . . and see how it adds up.

Ask your local Oakite Technical Service Representative to demonstrate the Oakite Hot-Spray Unit, or write for additional information to Oakite Products, Inc., 27A Rector Street, New York 6, N. Y.

Export Division Cable Address: Oakite

SPECIALIZED INDUSTRIAL CLEANING
OAKITE®
MATERIALS · METHODS · SERVICE
SCIENCE

Technical Service Representatives in Principal Cities of U. S. and Canada

Multi-Story Facility

—*Continued from page 127*

fibers. And the air is heated or cooled as necessary to maintain a constant 50F. temperature. In addition, the room is kept under a constant pressure (⅛-in. water) to prevent ingress of bacteria when doors are opened.

Blast type cooling units (Niagara) are positioned throughout the other fermenting, storage and government cellars, and in the carbonating, filter and racking rooms. Special coils, cooled with brine, are immersed in fermentation and storage tanks to hold the brew at the desired temperature.

Four Ammonia Compressors

Refrigeration is furnished by four vertical York compressors (capacity 900 tons). Refrigeration system is recirculated ammonia, with a surge drum and flooded controls.

Wort cooling is in three steps: First, the hot wort contacts pipes containing city water, which will be used in the next brew. (This water is heated from 53F. to 140F.) Next, comes further cooling, using lake water, and finally refrigerated brine.

Steam Generation. Steam is supplied at 150 psi. by two B & W Integral-Furnace boilers, each rated at 58,000 lb. per hr. Units are oil fired, with provision for converting to coal if necessary.

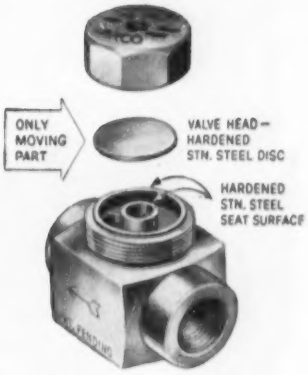
Water Supply. Chemical and mineral content of the Natick well water are such that only activated carbon filtration is required before its use in the brewing process. This same water is also used in the boilers.

For cooling purposes, water is pumped from the deepest part of Lake Cochituate (temperature 38-40F.) by three, 1,300 gpm. Worthington pumps. Following its use, this water is discharged over a series of rocks, waterfalls, spillways, and finally through three pools before returning to the lake.

Fire Protection. Bottling and shipping building is protected by 1,380 upright sprays (Grinnell Dura Speed), controlled by four alarm valves. The brewhouse, kitchens, washrooms, stores, records, stationary service and janitor rooms, hop storage, and loading dock are partially sprinkled. The grain drying area is protected by a completely automatic system, and the power house is partialy protected on the first floor.

(*Turn page*)

HOW TO
reduce steam trap inventory and practically eliminate maintenance
with the unique Sarco TD Thermo-Dynamic



ONE TYPE OF STEAM TRAP FOR PRACTICALLY ALL APPLICATIONS

The Sarco TD Thermodynamic is the most versatile steam trap ever developed.

It has large capacity . . . but small size. Insures rapid, continuous, complete drainage of condensate at saturated steam temperature. Has high air venting capacity.

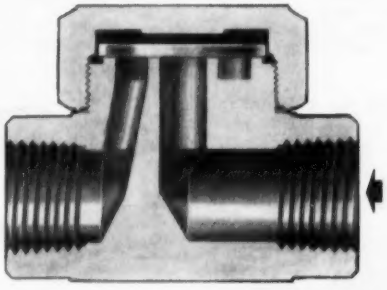
Operates perfectly on all loads . . . and when pressure fluctuates. Freeze-proof, when installed with outlet down. Highly resistant to superheat, water hammer, corrosive condensate.

ONE LARGE CAPACITY SEAT FOR ALL PRESSURES — 10 TO 600 PSI

Yes, in each size Sarco TD trap the same large capacity seat accommodates all pressures 10-600 psi . . . for heavy, light, or no condensate loads. Sizes ⅛ to 1".

Self-adjusting throughout entire pressure range . . . not a single change or adjustment required.

No need to stock seats and heads for various loads and pressures. Inventory simplified and reduced.



TROUBLE-FREE DESIGN NO VALVE MECHANISM — ONLY 3 PARTS

Look at that cross-section, left. That's all there is to a Sarco TD! What could be simpler?

Only 3 simple, rugged parts (single pieces — not assemblies) . . . all stainless steel. Only *one* moving part . . . a solid hardened stainless steel disc.

No mechanism . . . the kinetic energy of steam closes the valve. No narrow channels to choke. No gaskets to leak.

Actual service experience . . . in hundreds of plants . . . under severest conditions . . . has proved that the Sarco TD PRACTICALLY ELIMINATES MAINTENANCE.

2215-B

SARCO Thermo-Dynamic TRADE MARK **STEAM TRAP**

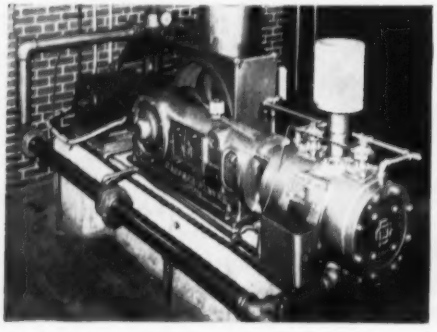
60-DAY TRIAL CONVINCES

We will gladly send you a Sarco TD steam trap and strainer for 60-day trial. No cost or obligation. You buy only if completely satisfied. Advise size — ⅜, ½, ¾ or 1" — and application. Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

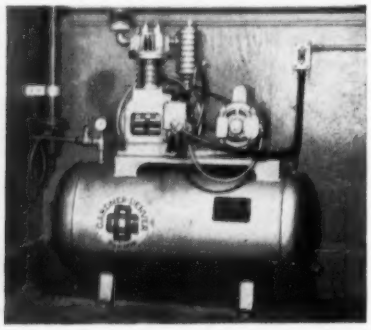
THE MODERN TRAP THAT IS MAKING STEAM TRAPPING HISTORY!

OIL... fine in its place but not in your product!

End your search for an oil-free air supply. These Gardner-Denver compressors deliver it in abundance, without special filters. Self-lubricating carbon in piston, piston rings and other parts eliminates the need for oil in the air cylinder. Air is delivered clean—free from oil vapor and other foreign matter.



Gardner-Denver CRX carbon piston compressor. Delivers low-cost, oil-free air around the clock. There is no need for two separate air systems; the CRX meets air demands with minimum maintenance. Sizes from 89 to 1292 c.f.m.



New Gardner-Denver CACB tank-mounted outfit. A small, space-saving, oil-free air producer. Supplies 4 to 5 cubic feet of air per minute. Suitable for discharge pressures of 40 to 100 p.s.i.

Send for bulletins.

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

Maintenance Facilities include two shops, one in the bottle shop, one in the power house. The latter serves power, brew, and storage buildings. Personnel comprises four electricians, two carpenters and nine mechanics.

QUALITY CONTROL

There are three laboratories: Main control on 3rd floor of brewhouse; the bacteriological lab next to it; and another unit in the bottle shop.

The main lab follows the beer from the wort stage to the government cellars. It also inspects incoming raw materials and constantly checks water used in brewing.

The bacteriological lab is responsible for cleanliness of the entire plant, including personnel. It is the watchdog on the lookout for any type of infectious bacteria that might contaminate the products.

The lab in the bottle shop maintains a constant check on pasteurization, bottle washing, and germ content of air.

WAREHOUSING AND HANDLING

Hops are stored in a 40F. 160,000-lb. capacity room on the 4th floor of the brewhouse. All grain is stored in three outside tanks (200,000 lb.) on the north wall of the brewhouse.

Shipping areas hold about 400,000 cases. All goods here are palletized. Shipping platforms have hydraulic elevators for truck and car loading.

EMPLOYEE FACILITIES

There are three plant cafeterias: One for office personnel, one for brewery workers, and one for bottle shop personnel.

The medical department has a full-time day-shift nurse.

All production employees are provided with full uniform service, including laundry.

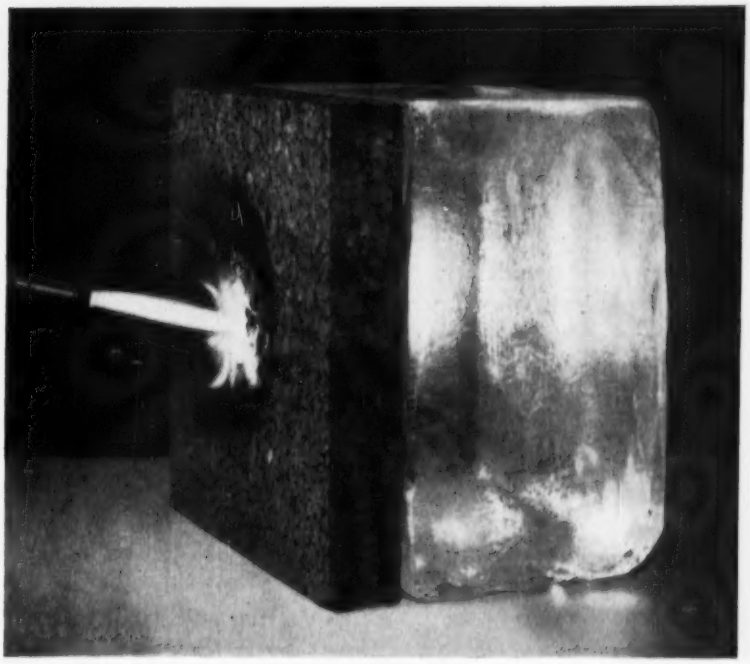
End (Resume reading on page 128)

Plant in Land of Plenty

—Continued from page 109

bus duct is better for the heavy load. It has the further advantage of providing handy flexibility in moving equipment or installing additional units. You can "plug" into it anywhere.

For handy communications within the big plant, Mr. Dunker investigated a new transistor radio receiver, made by Motorola. A supervisor



Why United's patented process results in corkboard of higher insulating value

Cork in its natural state is well known and highly regarded as an excellent insulating material. However, by an exclusive blocked-baked patented process that combines *both* external and internal heat in the moulding operation, United BB Corkboard is unsurpassed in insulating value.

Further, United Corkboard is 100% cork . . . with no filler added, and, its high strength in relation to light weight permits a sturdy self-supporting structure that is simple to erect. It's flexible too . . . fits accurately, works as easily as lumber and the natural resins released during processing further add to its excellent moisture resistant characteristics.

The next time you have a need for low temperature insulation investigate the unique combination of benefits only "patented process" United Corkboard can provide.

Write today for specifications and helpful installation data. No obligation.

UNITED BB CORKBOARD

UNITED CORK COMPANIES

Since 1907

2 Central Avenue, Kearny, New Jersey

ENGINEERING AND INSTALLATION SERVICE — to meet your individual requirement . . . insure the most effective use and provide proper installation, United maintains fifteen branches throughout the country, staffed with experienced engineers and installation crews. For the one nearest you simply write our Kearny address.

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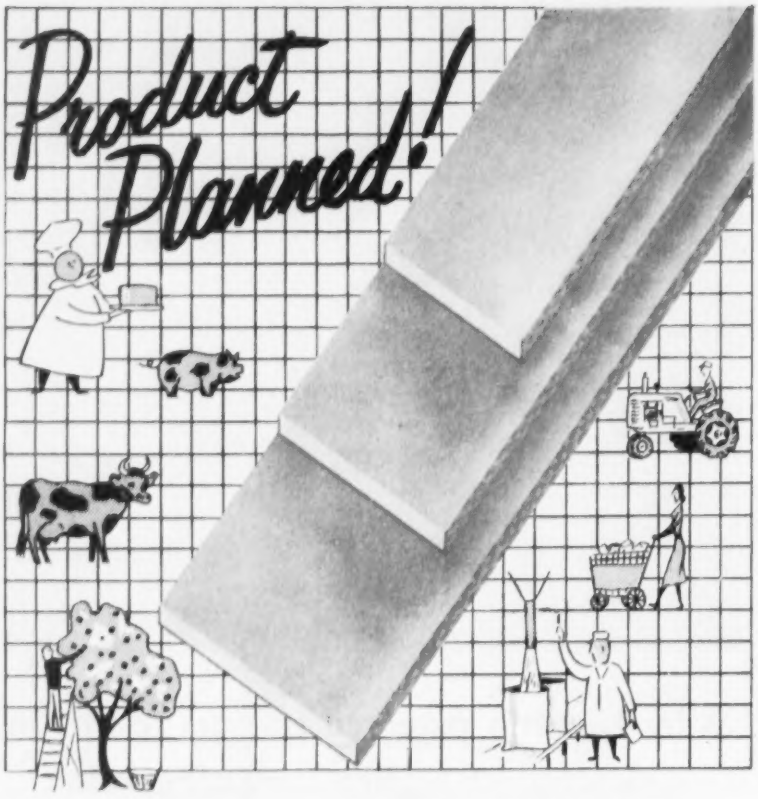


GLOBE BELTING

• Over 4 decades of Globe research has resulted in the finest quality of belts for the food industry — each one product-planned for efficiency.

Special constructions, impregnations and coatings have been developed to meet every conceivable problem of sanitation and resistance to acids, grease, oils, fats, alkalies or any other harmful elements.

For installations under the most adverse conditions or for standard applications, a Globe belt will give you unusual desirability, maximum service and minimum shutdowns.

BY GLOBE, FOR THE FOOD INDUSTRY:

WHITE SOLID WOVEN COTTON BELTING • IMPREGNATED PRESS-CURED BELTING • WATERPROOF AND WAX TREATED BELTING KANRY-TEX BELTING • HYCAR BELTING • NEOPRENE BELTING PLASCELL BELTING • CELLULOSE BELTING • STITCHED CANVAS BELTING • ROUND BRAIDED ENDLESS BELTS • HEVALOID ENDLESS BELTS • WOVEN ENDLESS BELTS • CLEANER AND SIFTER BRUSHES • WEBBINGS • HOISTING SLINGS • BELT DRESSING

GLOBE

GLOBE WOVEN BELTING CO., INC.
1400 CLINTON STREET • BUFFALO 6, NEW YORK

KNOWN FOR QUALITY THE WORLD OVER

can take one out of a rack and carry it in his pocket as he walks around the plant. Then he can receive messages on the run from a communications center. Heinz has ordered the radio receivers for two of its factories and is considering ordering more.

A minimum of 75 foot-candles of illumination is provided in process areas for close work. In the labs, the level is 50 fc., and daylight quality is obtained by a fluorescent-incandescent combination.

Light for filling operations is 35 to 50 fc.; for warehouses, 10 fc. All intensities are "maintained illumination."

General offices, the factory manager's office, and the quality control laboratory are air conditioned.

SANITATION, WASTE DISPOSAL

Contributing to easy sanitation are the tile and mastic floors in the kitchen areas. They can be washed down every day, without becoming pitted by corrosion to harbor dirt, bacteria, and mold.

The floors involve high first cost, but they pay off. Maintenance labor runs high these days, accounting for about 70% of repair costs against 30% two decades ago.

To carry waste water from process departments, the Tracy plant has covered trough-type floor drains. They are easy to clean—just remove covers and wash out with a hose. They also provide greater flexibility in moving machines. Equipment drain pipes can be run into them much more readily than they can be connected to under-floor drains.

Industrial waste is screened to remove heavy solids. Then the waste is pumped to Link-Belt vibrating screens to take out smaller vegetable solids. The effluent is discharged into the municipal waste disposal system. Waste vegetable material is trucked to the dehydrators.

Dry waste, mostly paper and wood, is burned in an incinerator.

PLANT SERVICES

Ventilation over process operations is special. In some operations, as much as 600 gal. of water is evaporated from the product in a 6-ft. diameter open cooker every 30 min. To carry this vapor outside the plant, stainless steel vent hoods are built over the process and connected to straight-line exhaust blowers. Some 42,000 cfm. of air is handled, calling for careful aerodynamic design of the hoods.

All air intakes in the Tracy plant

← For more data, circle this page number on card at back

If Your Tubing or Piping Application Requires Corrosion Resistance Here's The Plus The Job Needs...

FULLY HEAT TREATED B&W STAINLESS STEEL

The resistance to corrosion of a given grade of stainless steel depends upon its heat treated condition. For instance—the austenitic grades of stainless steel, such as the 18-8 group, have optimum resistance to corrosion only when they have been heated to certain high temperatures which "dissolve" all the carbides and then are rapidly cooled to keep these carbides "in solution."

The illustration shows a B&W Stainless Steel Tube leaving the heat treating furnace. In a little over a foot of travel and in a couple of seconds, the temperature of the tube is reduced from around 2000 F. to one where the operator can place a bare hand on it without harm. This tube offers maximum resistance to general corrosion.

At B&W the heat treatments of all grades of stainless tubing are rigidly controlled. And the same type of controls are on *B&W Welded* as are on *B&W Seamless* stainless tubular products. And the same kind of specialized care is given to tubular products intended for distributor stocks as that given to material intended for direct shipment to the user.

For virtually any application—pressure or mechanical—B&W can provide either seamless or welded stainless tubing in any number of grades, in a broad size range, and with the properties needed for optimum service life and ease of fabrication For stainless steel tubular products—specify B&W and be sure.

The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-7007-PG4

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels

are equipped with removable filters.

Steam Generation. Two package-type boilers and three stationary, or built-in, units generate steam for processing and space heating at 125 psi. Fuel is gas, with standby provision to burn oil. Control is automatic.

The package boilers give you more for your money, Mr. Dunker finds. Not only is the investment lower per boiler horsepower, but power "flexibility" is greater. The boilers may be moved with relative ease.

"High pressure" space heating is found advantageous at Tracy. By supplying steam at 100 psi. to heaters, not only is a higher rate of heat transfer achieved but no pressure reducing valves are required.

Heat balance at the plant has been engineered for Btu. efficiency.

Water Supply. To conserve water, supplied by municipal wells, the plant uses the same water as many as four times. Re-use applications are such that fresh water is not required. Looking to the future, Mr. Dunker sees the possibility of using water over and over, with only about 10% makeup. The water would be clarified and chlorinated to "recondition" it.

Plant Cleaning. Kitchen areas are washed with Sellers pressure units to conserve labor in plant cleanup. Heinz considers this important because a good part of plant overhead is allocated to clean-up and maintenance. This necessitates proper programming of what, when, and how to clean.

Fire Protection. Sprinklers are installed throughout the Tracy factory, fire extinguishers suited to the hazard are handy, and the entire plant it looped with a water line. Hose houses are spotted at intervals, with men assigned to them. Fire drills are held regularly.

Use of exterior hoses is considered necessary for adequate fire protection.

Maintenance Facilities. The plant has a small machine shop in which light equipment can be built, and machines can be adapted to special purposes. A portable welder proves extremely useful in plant maintenance.

QUALITY CONTROL

Heinz has an outstanding quality control lab in the Tracy plant. Centrally located in the production area, it is two stories high, 32x125 ft., with two rooms and 8,000 sq. ft. of floor space. To save aisle space, the lab has an outside walkway on the floor level and an elevated walkway alongside the second story. Service lines are carried in a core behind lab walls so that equipment can be moved and tapped in anywhere.

This modern air conditioned lab is being equipped for organoleptic and bacteriological work and spray-residue determinations. Another quality control facility is a gas-tight fumigation room.

WAREHOUSING AND HANDLING

Warehouse materials handling is all palletized. And the Tracy plant now is starting to use Pul-Pak disposable paper pallets for unit loads to be shipped East.

Cans of materials to be shipped East for further processing are not cased but are strapped to pallets. This is a Western Pacific Railroad development.

Incoming raw fruits and vegetables are in palletized lug boxes, and most materials are handled by automatic machines which dump one row of boxes at a time from pallets. Fifty fork-lift trucks, 5 tractor jitneys, and 2 yard trucks are used.

End (Resume reading on page 110)

BACKSTAY WELT COMPANY, INC.
MANUFACTURERS OF QUALITY Welts - Gemps - Bindings
UNION CITY, INDIANA

May 23, 1957

The James Leffel & Company
426 East Street
Springfield, Ohio

Attention: Mr. J. Robert Groff,
President & General Mgr.

Dear Mr. Groff:

In August of 1954 we purchased one of your conservatively rated Leffel 75 HP oil fired Scotch Boilers. We have found that due to its rugged construction it will develop up to 150 HP, or double its conservative rating.

We were told that it would provide a continuous reliable and economical source of steam for many trouble-free years. When we bought this boiler we were sold on its strength of construction, and when we analyzed all of the important quality features we got in the Leffel boiler, the price we considered to be fair. We realize that Leffel can not give all of these extra features for the lowest price, but we believe that in the end -- from our experience -- it turns out that it is the lowest actual cost to the customer.

After two and one-half years of constant use we are firmly convinced that the Leffel Scotch boiler does everything claimed for it, and much more besides. We like your conservative design and presentation, for when performance outruns promises the user is very happy indeed.

Our Maintenance Department states the fuel consumption is low and that we haven't had any repairs to make, and that the boiler is exceedingly responsive and easy to clean and maintain.

We certainly are well pleased with our Leffel boiler in every way. We also like to do business with a firm like yours which is almost one hundred years old and which -- it seems to us -- values the business and which looks after the interest of its customers.

With best wishes.

Yours very truly,
BACKSTAY WELT COMPANY, INC.
G. G. Barrie

G. G. Barrie

Low Cost Steam is a Reality at the Backstay Welt Company

The solidly constructed Leffel boiler at the Backstay Welt Company, Union City, Indiana, provides efficient, economical steam even when operating at double its normal rating.

The heavy-duty construction, economical maintenance and extra power of Leffel boilers can make low cost steam a reality for you, too.

Many Leffel boilers throughout the country are still providing low cost steam even after 50 years of efficient service because they're built as only Leffel can build them.

Before you buy a boiler . . . take a look at Leffel. Available in sizes to meet requirements from 6 to 500 H.P., coal, oil or gas fired.

Bulletin 236, free on request, gives complete details on Leffel boilers for oil, gas or coal firing. If you need help in planning your boiler installation, Leffel engineers—backed by 95 years of experience in efficient steam generation—are available for consultation without obligation.

THE JAMES LEFFEL & CO.
FOUNDED IN 1862
MORE EFFICIENT STEAM GENERATION FOR 95 YEARS
Dept. E, SPRINGFIELD, OHIO

Choosing a fluid mixer for **top performance**

You can get better mixing, and avoid many regrets, by asking yourself these five important questions before you buy a mixer for fluids:

1. *Can I be sure, in advance, that I'll get the uniformity I want, as fast as I want it?* You can—when you mix with LIGHTNIN Mixers. Every LIGHTNIN is guaranteed, unconditionally, to do the job you expect it to do.

2. *How can I get ready to meet a change in mixing requirements?* Simply buy with an eye to your future needs. One good way to keep your mixing operation flexible: use LIGHTNIN Portable Mixers. You can clamp them on any open tank; switch to a different vessel later and change shaft length and propeller size to meet the new requirements.

Caution: Be sure the mixer is sized big enough now to handle the toughest job you'll give it.

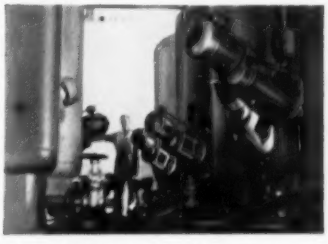
3. *Will I be able to get replacement parts in a hurry if I ever need them?* You avoid waiting for special parts when you use LIGHTNIN Mixers. They're built entirely of standard interchangeable components—always in stock, ready to ship on shortest notice.

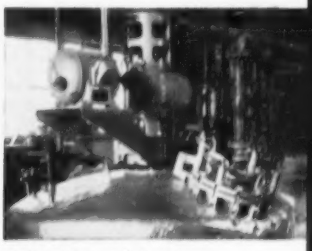
4. *Do some mixing jobs require special impellers?* Careful laboratory and field tests prove you can handle at least 95% of your fluid mixing needs with a standard 3-blade propeller (or standard flat-blade or curved-blade turbine, on large mixers). The exact balance of *flow* and *turbulence* you need is easily obtained by varying the size and speed of the impellers. You get guaranteed mixing results with lower-cost standard impellers when you mix with LIGHTNINS.

(You can, of course, get a wide choice of LIGHTNIN special impellers for those few mixing jobs requiring them.)

5. *Where can I get prompt, competent service on fluid mixing?* Just call your LIGHTNIN Mixer representative. He knows fluid mixing thoroughly—can quickly give you a *guaranteed* recommendation. And he's near you—look him up in Thomas' Register. Or write us direct.

GET RAPID DOUBLE-ACTION MIXING, or slow gentle stirring, in any open tank, with any of 30 LIGHTNIN Portable Mixers in sizes from ⅛ to 3 HP. No baffles are needed in the tank, and maintenance is extremely simple.





IN TANKS OF ANY SHAPE, you can get just-right mixing to bring your product quickly to uniformity. Propeller-type LIGHTNINS (left) are supplied for open or closed tanks. Turbine-type LIGHTNINs (right) are available in hundreds of power-speed combinations, with interchangeable speeds, in sizes from 1 to 500 HP.

WHAT SIZE AND TYPE of mixer do you need? Check here for latest bulletins giving full description, packed with helpful facts on mixing:

- ☐ Turbine, paddle, propeller types: top or bottom entering: 1 to 500 HP (B-102)
- ☐ Propeller types; top entering: ¼ to 3 HP (B-103)
- ☐ Portable: ⅛ to 3 HP (B-108)
- ☐ Side entering: 1 to 25 HP (B-104)
- ☐ Laboratory and small-batch production types (B-112)
- ☐ Condensed catalog showing all types (B-109)
- ☐ Quick-change rotary mechanical seals for pressure and vacuum mixing (B-111)
- ☐ Data sheet for figuring mixer requirements (B-107)

Check, clip, and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc., 143-k Mt. Read Blvd., Rochester 11, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 10, Ont.

"Lightnin® Mixers"

MIXCO fluid mixing specialists

Flexibility Stressed

In Advanced Canning Line

Dynamic setup has fast-action interchangeable units for processing and packing various products in a number of uniform sizes

EXCEPTIONAL FLEXIBILITY, backed by topnotch production innovations, features the single processing line at Mammoth Spring Canning Co., Sussex, Wis. (see accompanying foldout flowsheet).

And although the line was laid out for uninterrupted canning of 16 different types of beet products, it is readily interchanged for handling carrots and many of the innovations are applicable to other canning operations.

Noteworthy is the pre-sizing system for separating product into sizes over and under 1⅞ in. The "unders" are diverted to continuous peelers, and the "overs" to trimming tables.

This system has resulted in a substantial increase of whole beets, along with a reduction in trimming losses. Such losses are further cut by employing a pair of FMC continuous peelers.

Tumbler-type reels, flumes, and an in-plant chlorination system assure canning of first-quality products. Water for processing contains 3-5 ppm. chlorine. And that for plant and equipment cleanups, carried out at the end of each day's production, has 25 ppm.

A specially designed combination blancher and lye cooker has provided these notable benefits:

1. **Greater capacity,** output being doubled.

2. **Continuous and more uniform blanching and cooking.** Temperatures are instrument-controlled, product travel is adjusted through variable-speed drives, and lye concentration is maintained at 3% by a mechanical chemical feeder and recirculation system.

3. **Savings in floor space.** Present equipment uses approximately 3x15 ft., whereas former unit took up about 4x40 ft.

4. **Less time for maintenance,** since simply designed unit has fewer mechanical parts.

Feeding of products to the three filling lines has been facilitated by an electric hoist system for transferring them from portable trucks into hoppers of filling machines.

A company-designed double-hopper speeds delivery to filling machines and, at the same time, permits operator to inspect the product. Each hopper section comprises a short auger feed that carries products to pockets of filling machines.

OPERATIONS PINPOINTED

Now let's run through Mammoth's unimpeded line-flow layout, as detailed in our flowsheet.

Vegetables are harvested in nearby fields and rushed to the cannery in trucks, which are emptied into a ground-level hopper—see Point (1).

Next, an inclined slatted-chain conveyor elevates them to a rod-type reel, with rods spaced 1 in. apart. Field dirt is thus separated. Then beets are transferred to a horizontal, slatted chain conveyor with bottom belt sling, which moves them to a 40x70 ft., 250-ton capacity storage room—Point (2). Here, three wire-mesh conveyors, at right angles to the incoming one, travel along T-beams to distribute the vegetables into eight piles.

A pair of 1-in. overhead pipes, with nozzles spaced

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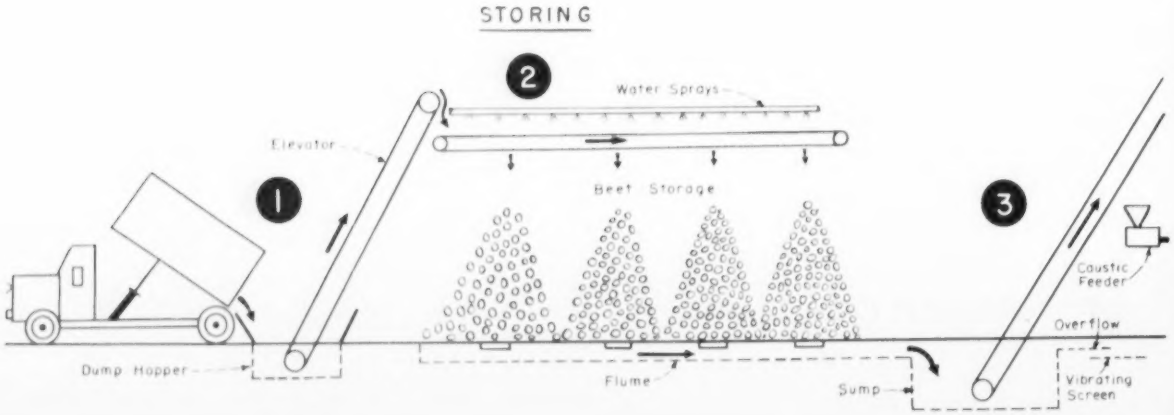


1 **VEGETABLES**, trucked from nearby fields, are dumped into hopper, then elevated on conveyor (rear) to cleaning reel, and moved to storage.

2 **TRANSFER CONVEYOR** (rear) is one of three that move products to different locations in the 250-ton capacity storage room. Overhead coils in room, spray water on products to keep them fresh

4½ ft. apart, spray water on products stored overnight and, in this way, keep them fresh and cool.

As needed, the product proceeds through seven flumes below the floor to a 5x5½x8-ft. sump—Point (3). These flumes (14x18-in., with a ½-in.-per-ft. slope) serve two purposes—washing and conveying.

Beets are water-sprayed as an inclined-flight chain conveyor elevates them from the sump to a 500-lb.-capacity hopper feeding the combination blancher-lye cooker—Point (4).

TREATED IN BLANCHER-COOKER

At this stage they get a 14-min. steam blanch (212F.) as helical screws move them, in sequence, through a pair of tubular-type blanchers (1½x14 ft.), mounted one above the other.

A baffle at discharge end of bottom blancher separates the beets into two streams, which proceed into side-by-side tubular-type lye cookers (1½x14 ft.). Here, helical screws carry them, at a 7-min.-rate, through 3% hot (212F.) caustic solution. Lye is constantly recirculated and made up to proper concentration with dry caustic by a chemical feeder.

At end of blanch and lye-cook, an inclined screw conveys the beets to a washing reel—Point (5). Then an inclined flight conveyor transfers them to a hopper for manual and chute feeding of five Sterling abrasive-type peelers—Point (6).

Still another inclined conveyor elevates peeled beets to a rotary, pre-sizing grader. Those under 1⅞-in. size go to the whole-beet line. The larger ones proceed to the sliced-beet line.

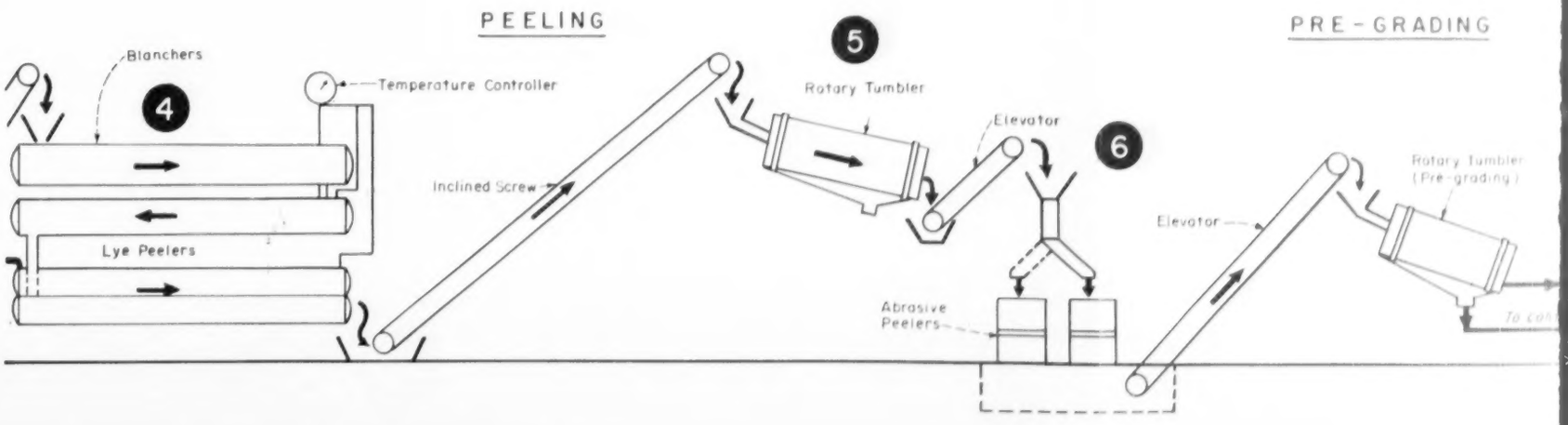
Whole beets are elevated from pre-sizer to two FMC continuous peelers—Point (7). They are reel-graded into five sizes (1-, 1⅛-, 1¼-, 1⅜-, and 1½-in.), then chute onto wire-mesh inspection belts before being collected in 600-lb. and 800-lb. portable bins.

For the slice pack, the oversize beets continue to a trimming table. Then they are conveyed to four graders that separate them into 1⅛-, 2-, 2¼-, and 2½-in. sizes. Beets over 2½ in. go to machines that form them, respectively, into segments (two sizes), diced product, and shoestrings.

All four slice-pack sizes continue to rotary-type Urschel slicers. Rotary graders separate the slices from chips, which go into the salad pack. Slices drop onto wire-mesh inspection belts—Point (8)—before they are collected in portable metal bins, ready for canning.

Bins containing whole, sliced, or other cut forms, are emptied by electric hoist into hoppers of filling machines—Point (9). Following packing in cans (8-oz., 12-oz., and 1-gal.) by rotary, pocket-type fillers, automatic dispensers add the desired quantity of salt.

Then seamers close the cans, which are loaded into crates and heat processed. They are finally unloaded into a water-cooling canal, dried, labeled, packed in shipping cases, and loaded onto pallets for electric lift truck delivery to warehouses or transfer to outgoing trucks.



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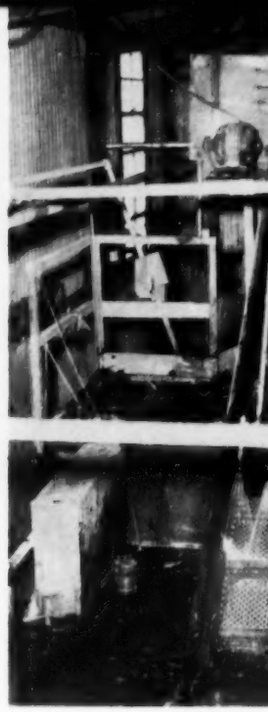

3 FLIGHT CONVEYOR from sump into which the storage, discharges them to bla

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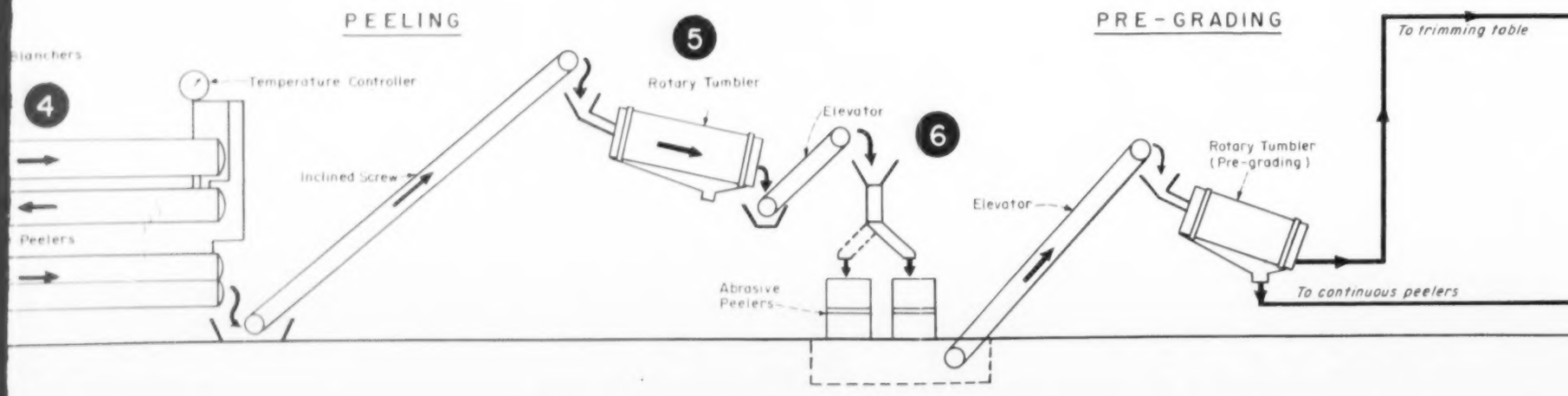
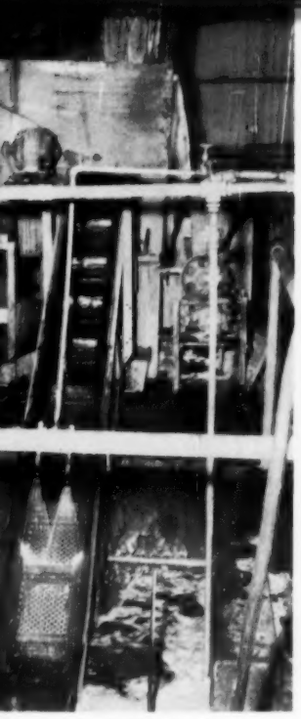
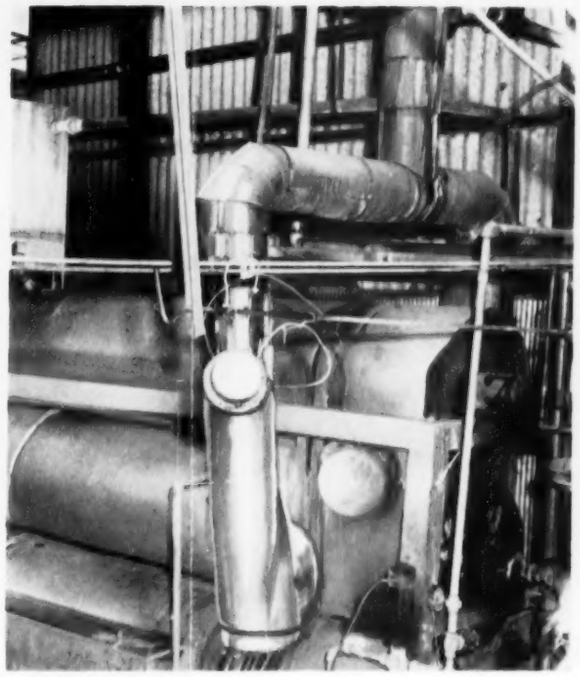
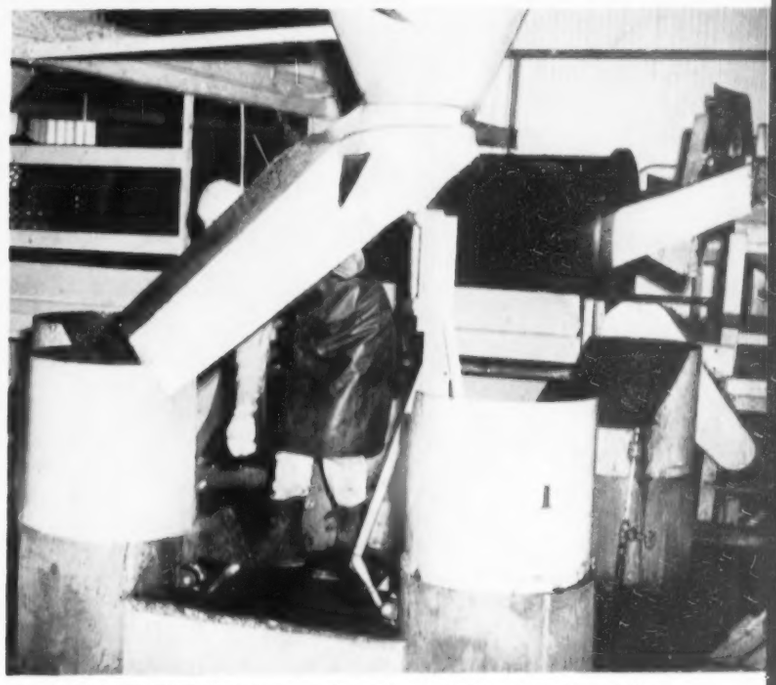




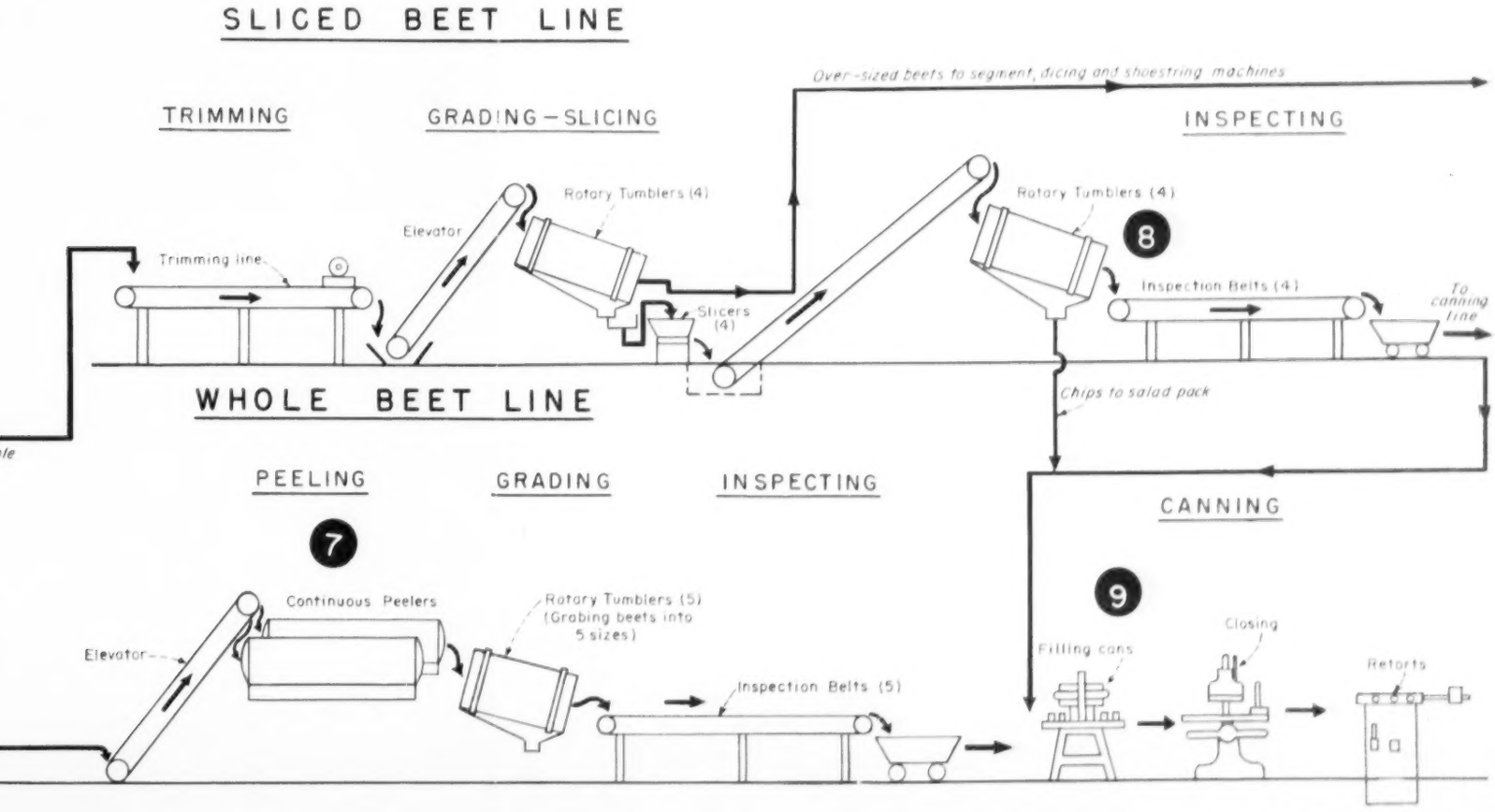
EYOR (center) elevates products hich they have been flumed from to blancher-lye cooker.

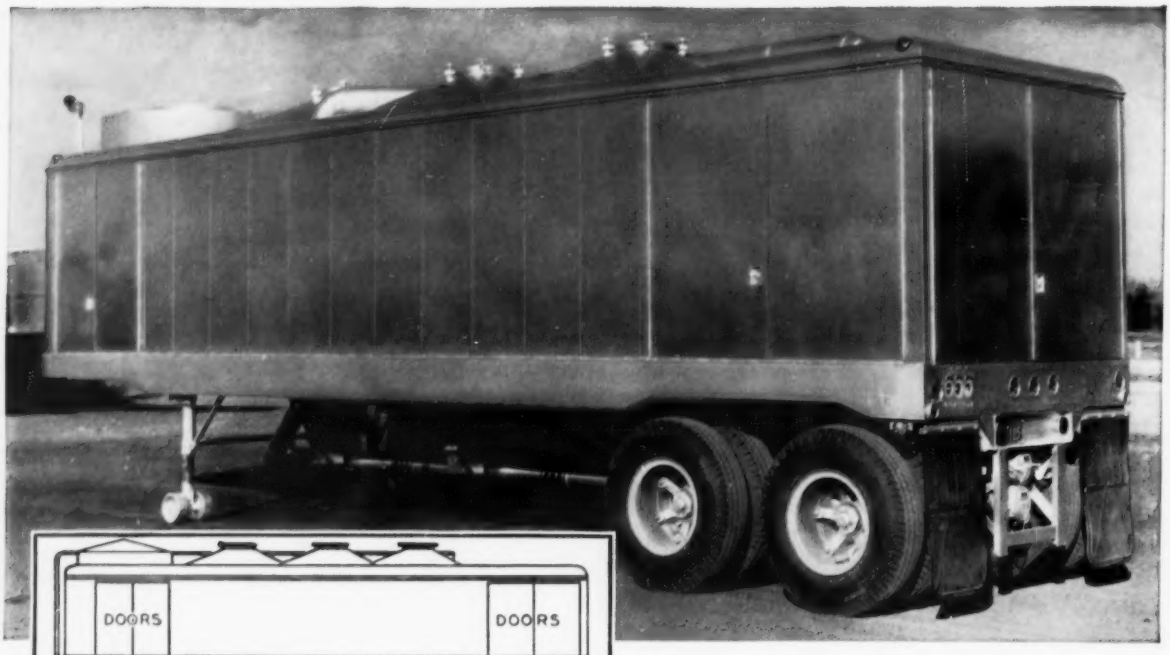


4 VEGETABLES get 14-min. steam blanch as they are conveyed in sequence through the top two horizontal tubes, then get 7-min. lye treatment in parallel tubes below.



6 ABRASIVE PEELERS (foreground) receive whole beets from hopper above. Then they are pre-sized, with those under $1\frac{7}{8}$ in. going to FMC peelers (right rear) which discharge to grading reels (rear).





For the best in sugar handling . . .

The AIRVEYOR® BULK TRANSPORT

Again, Fuller comes to the fore with a much needed, efficient means of transporting sugar in large quantities . . . The Airveyor Bulk Transport.

Equipped with pneumatic handling equipment, designed and built by Fuller engineers, with 30 years of experience in the conveying of bulk materials, this trailer will meet the demands of the most exacting purchaser of sugar in quantity. This transport may be loaded pneumatically from a bulk railroad car at a team track or, through hatches on top of the trailer, by gravity from an overhead source. Unloading is done pneumatically by a gas-driven engine installed on the trailer.

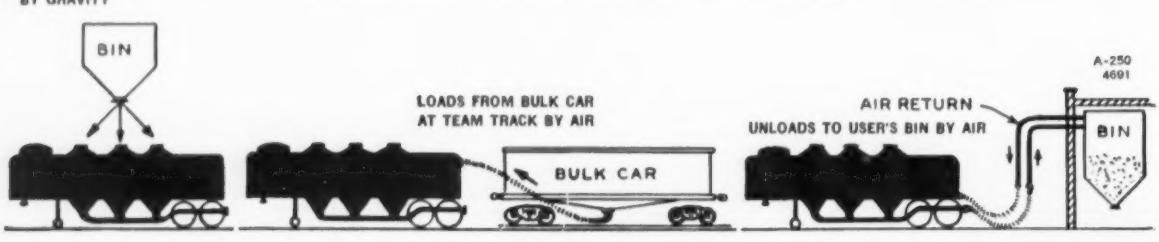
A compartment, of ample walk-in space at the rear, houses the engine, blower, and controls. Conveying hoses are stored in a locker underneath the trailer. The cargo may be conveyed to storage bins several hundred feet away or a number of stories above street level.

The trailer illustrated has a net payload space of 600 cu. ft. (15 tons of sugar), consisting of three containers; other payload ratings are available. Sugar flows from the containers into a common underslung transport pipe, connected by a flexible hose to a permanent conveying duct at the user's plant. No rotary feeders are used, thus alleviating crystal degradation and inherent maintenance problems. Unloading rate varies from 20 to 40 tons an hour, depending on conveying distance.

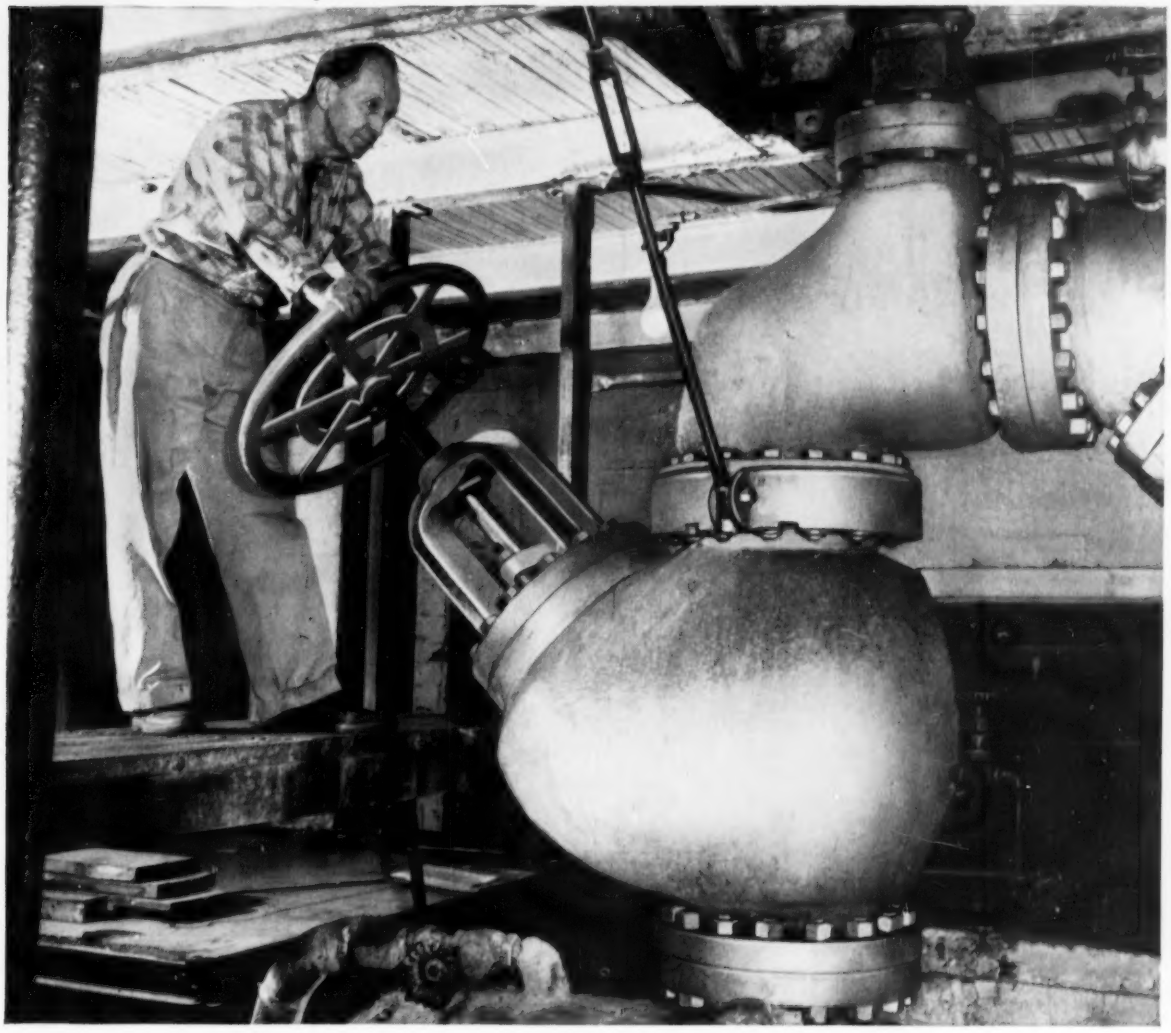
Dust laden return air from user's bin is recirculated and then cleaned by a filter installed on the trailer. This eliminates the purchase and installation of a dust collector in the plant. The recirculation of air assures freedom from accumulation of atmospheric moisture. All metal having contact with the sugar is stainless steel.

If you have a sugar handling problem, better consult a Fuller engineer for advice as how to best solve that problem.

FULLER COMPANY
114 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham · Chicago · Kansas City · Los Angeles · San Francisco · Seattle



Crane Valves Pay for Themselves in Trouble-Free Maintenance



Beginning another 50 years of cost-free valve service

This remarkable case history proves how the right valve can save money in repairs and maintenance—again and again.

This Crane 10-inch stop-check valve has been in use since 1906 at Seattle Cedar Lumber Mfg. Co., Seattle, Wash. Operating at 360° F. and 150 psi., the valve is closed every third or fourth night when one of 3 boilers is shut down. The valve is also closed every 3 weeks when the boiler is down for inspection and cleaning. About a year ago, this Crane No. 28E Ferrosteel valve was opened for inspection, cleaned up, and put back into service. Repair parts needed? None.

In short, all 50 years have done to this Crane valve is emphasize how rugged and dependable it has proved, and how important it is to use quality valves on every service. For complete information on any valve problem, contact your Crane Representative.

YOU'LL FIND GOOD tips on valves in "Valve Performance Facts"—32 case histories throughout industry. Ask your Crane Man for a copy or write to address below.

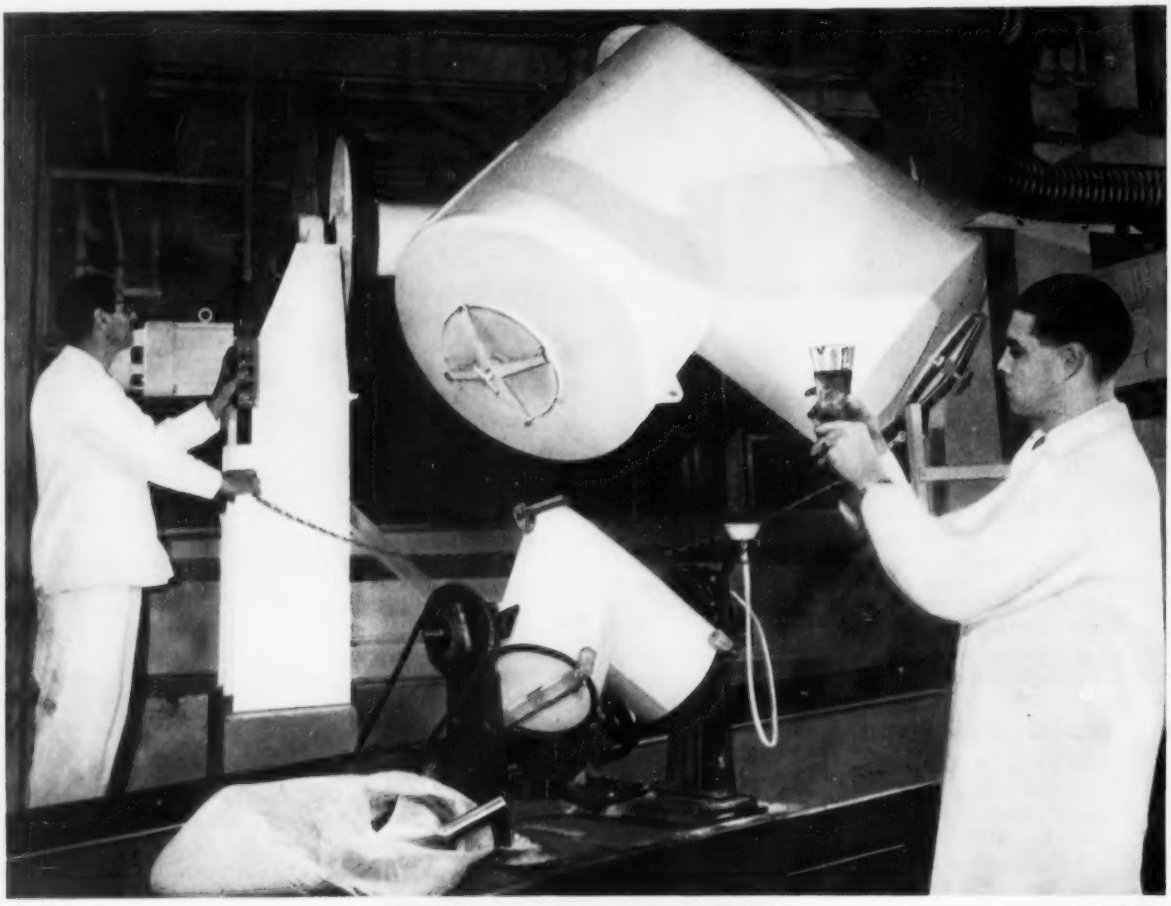
CRANE VALVES & FITTINGS

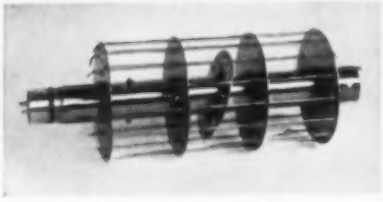
PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Now! For the first time

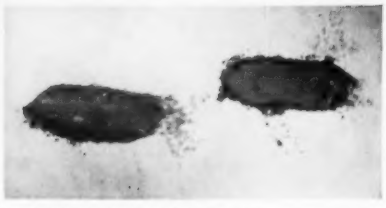
intimately blend any liquid, regardless of viscosity, into dry solids–in one fast step–even up to 40% liquid volume by weight





VERSATILE. This wire cage assembly gives you three blenders in one. With it you can blend liquids into solids, or obtain dry intensive mixing action. Remove it and get gentle blending.

TYPICAL EXAMPLE. Bar breaks down agglomerates in material at left and prevents new agglomeration as liquid is added. Note uniform consistency in finished blend at right.



ABSOLUTE UNIFORMITY. Laboratory smear test reveals streaks where standard blending methods are used (left). With P-K's exclusive design, complete blending is assured (right).

These results can be proved in your own lab with a P-K Laboratory Model Liquid-Solids* Blender. 8 or 16 qt. capacity available from stock for instant delivery.

Scale-ups from lab tests are equalled or bettered in P-K production models with capacities from 1 to 50 cubic feet. This is a completely new concept in liquid-solids blending –exclusive with P-K.

Write now for Bulletins 15A on lab units, 7-15-A on production units of P-K liquid-solids blenders. The Patterson-Kelley Co., Inc., 410 Hanson Street, East Stroudsburg, Pa.

Patterson Kelley

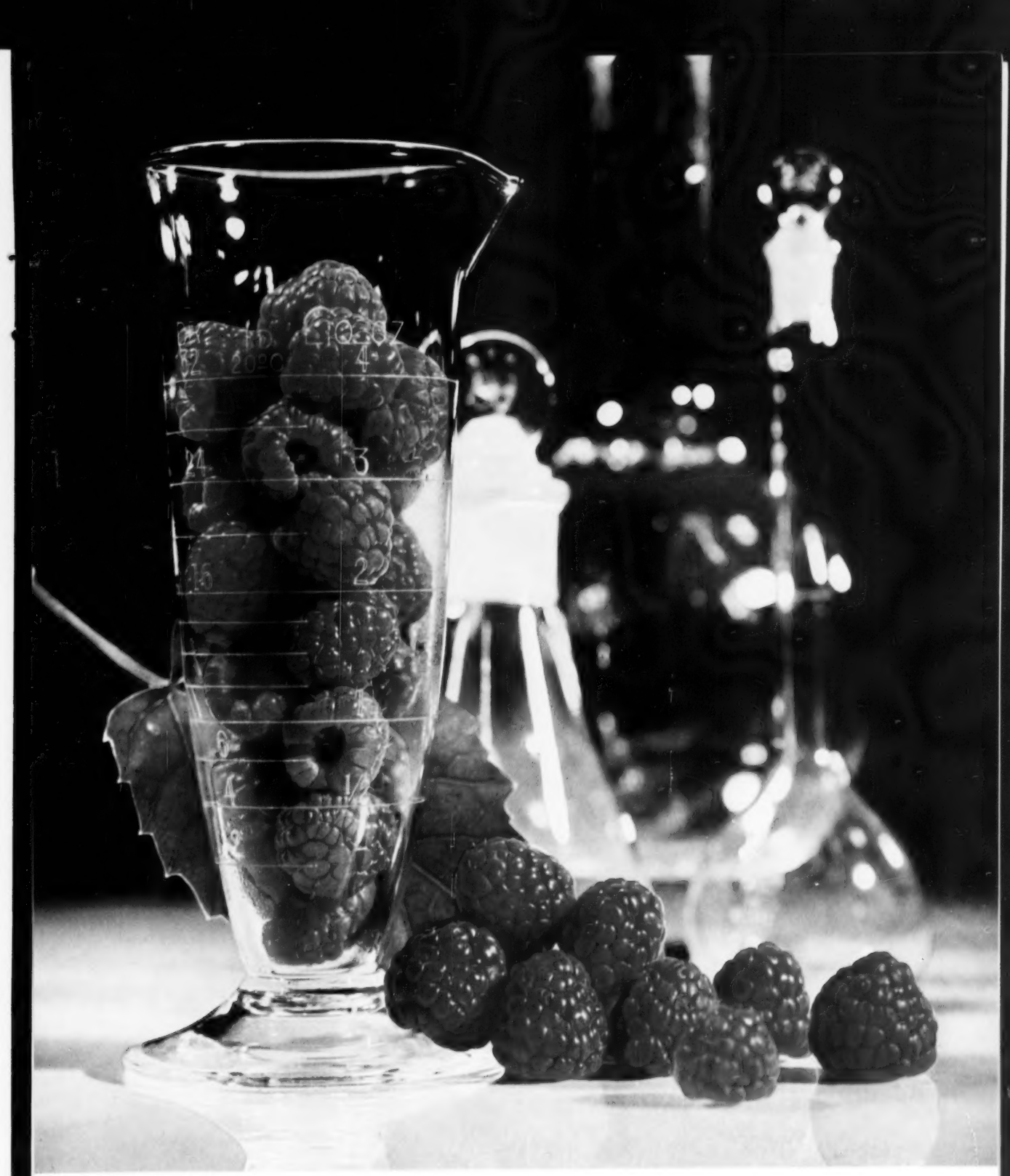
Chemical and Process Division

P-K Twin Shell Blenders* • Heat Exchangers

Packaged Pilot Plants • P-K Lever-Lock Doors*

*Patents pending

← For more data, circle this page number on card at back



IMITATION RASPBERRY BY FIRMENICH

You get the direct and authentic reproduction of raspberries in their full perfection in Raspberry Flavor by Firmenich. For Firmenich took fully ripe raspberries, freshly severed from the stem, captured their delicate and fugitive flavor, and by original research reconstructed it with all its significant and desirable components. Firmenich Raspberry comes to you as a precise and potent flavor material of the utmost purity and stability to enhance the flavor of your products and to give them greater sales appeal. Samples and technical data on request.

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GENEVE SUISSE

FIRMENICH INCORPORATED

[illegible]

No Spoilage Bacteria
IN THIS SHIPMENT

it's filtered with CELITE

Whether you are refining sugar or buying it for use in your process operations, you can be sure that liquid sugar is free of thermophilic bacteria when it is filtered with Celite*. Efficient, economical Celite filtration delivers brilliantly clear liquid sugar that will remain positively pure as long as it is protected from recontamination by spores in the surrounding air.

Celite is also ideal for filtering other food products such as syrups, jellies, beer and wine. Composed of microscopic particles of pure inert diatomaceous silica, Celite provides fast, economical clarification . . . never affects the most delicate flavors.

And with Celite you get important advantages over other diatomites. Its lower wet density means greater filter surface coverage. Its high uniformity means more consistent results. For more information on how Celite filtration helps the food industry make better products at lower cost, call your near-by Celite engineer or write Johns-Manville, Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

Johns-Manville CELITE
diatomite filter aids

JOHNS-MANVILLE PRODUCTS

KEEPING UP WITH THE FIELD

New Product from Pineapple

Latest engineering and production studies on the extraction of an enzyme, bromelain, from pineapples (FE Oct. '56, p. 181) show that it is commercially possible to produce the product from the stump of the pineapple plant. Seen above is acetone precipitation and centrifugal separation of the enzyme at Hawaiian Pineapple Co., Honolulu. The engineering study is being conducted by Arthur D. Little, Inc.

To Probe Handling of Frozens

Improved methods for handling frozen foods will be spelled out for processors, distributors, and retailers by a special fifteen-man task force committee, recently appointed by Sterling B. Doughty, president of the National Assn. of Frozen Food Packers.

Prime objectives for the group—picked to counteract recent charges of mishandling and low quality in the field—are to impress on handlers the drastic effects of high storage temperatures, and to educate them in correct handling methods.

Canco Eyes Aluminum Cans

American Can Co.—hitherto unknown factor in the race for a marketable aluminum can—has come into the open, announcing stepped-up activity in this area through establishment of an aluminum division in its research and technical department.

According to company president, W. C. Stolk, high cost of tinplate has narrowed the gap between the two metals, and future market developments could lead to extensive use of aluminum for containers—making imperative the need for new technical information and can-making skills.

FDA Caught in Budget Squeeze, May Cut Back Program

A clampdown on Federal spending, instituted by the Bureau of the Budget, poses a serious threat to several new programs planned by FDA for the current fiscal year.

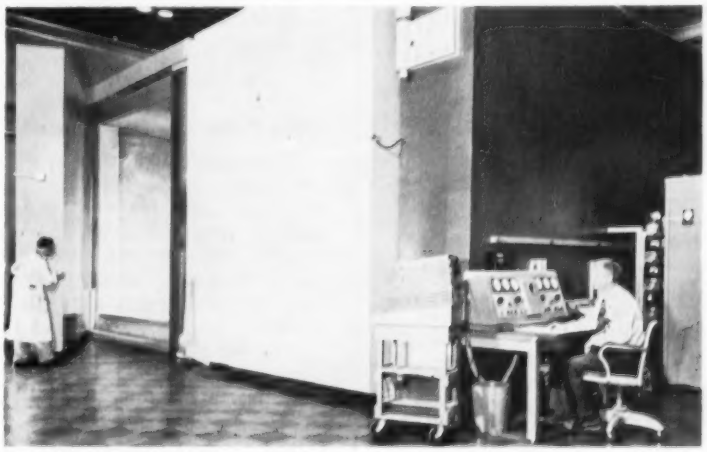
Deputy FDA Director J. Harvey discloses that the Bureau has released only enough funds to operate the agency for the July-Sept. quarter at the same spending level as last year, and will give no assurances that future quarterly apportionments will reflect the increased money voted FDA by Congress (FE May, '56).

If future allocations follow this pattern, he declares, FDA will be unable to fill 40 additional technical and scientific posts—which will slow down or defer plans for analysis of emulsifying agents, investigation of decomposition in foods, and the establishment of new standards for foods.

Support for Packaging Studies

Financial assistance and promotional support for the packaging curriculum at Michigan State University will now stem from a nonprofit corporation, Packaging Foundation, Inc., organized especially for the purpose.

Immediate objectives of the group—which includes three MSU officials, an industrial executive, and a trade publication editor—are to provide a suitable physical plant at the university, establish a research program in packaging, and finance graduate studies in this field for advanced students.

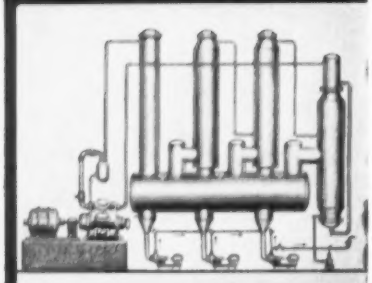


Powerful Aid in A-Ray Studies

Engineers check out operation of a giant 3,500,000-volt electron beam generator that was revealed publicly by General Electric Co. at its recent electron beam symposium in Milwaukee. The powerful unit is expected to play a key role in the mounting research program on radiation sterilization of foods—which industry experts are predicting will bear commercial fruit in the very near future.

Mojonnier

LO-TEMP EVAPORATORS



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- **concentrating heat sensitive chemical solutions**
- **recovering solvents**

- **No steam required.**
- **Uses negligible amount of condensing water.**
- **Low operating temperatures.**
- **Less operating attention.**

adds up to *lowest concentrating cost!*

Pictured Above —

MOJONNIER TRIPLE-EFFECT LO-TEMP EVAPORATOR as installed in large chemical plant, evaporating 5,000 lbs. of water per hour from a chemical solution at a maximum temperature of approximately 40° C. The unit uses a 75 h.p. ammonia compressor.

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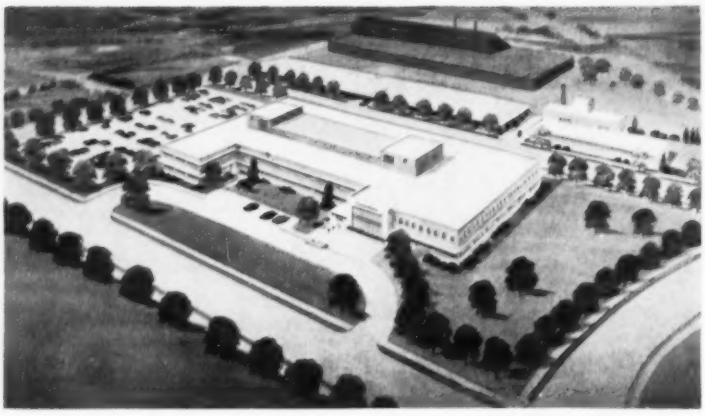
Sales Offices in Principal Cities



Processor Moves General Offices

After 88 years in the same place, Campbell Soup Co. has moved its general offices to a new location in Camden, N. J. The modern building situated on a 14-acre plot and covering over 136,000 sq. ft. is a two-story structure of reinforced concrete faced with brick and marble. Architect and engineer: A. D. Crosett & Assocs., N. Y. C. Builder: Turner Construction Co., Philadelphia.

Predicts Zoom in Frozens

An avalanche of frozen foods is predicted during the next ten years by Gustav L. Nordstrom, executive director of the Folding Paper Box Assn.

Backing up this estimate, he points to the 1,250,000 tons of special food paperboard consumed in '56—culmination of annual increases of 16% since 1942—and quotes an estimate from the Commerce Dept. that food-board tonnage will be 3,100,000 tons by 1965.

To a great extent, he continues, these rises have been and will be brought about by frozen products—foods that are making drastic changes in the eating habits of the nation.

Cuts Price on Cellophanes

Price reductions of 5¢ per lb. are announced by du Pont Co., Wilmington, Del., for two, polymer-coated cellophanes, K-202 and K-203. The cut puts price of the special wrapping materials at 79¢ per lb. (80½¢ in eight Western states).

The K cellophanes are coming into increased use for baked goods and frozen foods because of their increased protective properties.

FWS Eyes Processing Ship

Preliminary design of a North Atlantic trawler, equipped to freeze its catch at sea, is the subject of an engineering contract recently awarded by the Fish & Wildlife Service to Dwight Simpson and Assocs., Boston.

Request for the study was made by the New England Committee for Aid to the Groundfish Industry. It is expected to reveal the feasibility of operating a diesel-powered ship, measuring over 140 ft., over long distances, and the necessary capacity for a profitable payload.

New Dairy Sales, Same Profit

Despite the fact that milk and dairy product sales rose to a new high in '56—over $10,000,000,000—profit margins remained the same as in '55—about ¼¢ per qt.—according to latest figures from the Milk Industry Foundation.

Sales of milk and cream—up $253,000,000 to $6,418,010,000—were primarily responsible for the new record sales. And while profits rose slightly in '56—from 2.18¢ ('55) to 2.23¢—cost of raw milk to the dairies increased from 47.64 to 50.03¢.

Today's Pack, Objet d'Art?

Pictorial packaging—the increased use of photo reproductions or realistic drawings—is turning supermarkets into "art galleries", according to H. H. Robbins, executive secretary, Paraffined Carton Research Council.

This trend is particularly pointed toward displaying the product in action, he adds, and has become so important in self-service outlets that even small manufacturers find it worthwhile to bear the extra cost.

What's up in closures?

Plastisol Cap Liners made with Low Cost

CITROFLEX A-4 *Plasticizer are Nontoxic...Odor-Free!*

● A good jar can do its job *only* if the lid offers the same protection as the glass.

That means that the sealing ring and liner inside the lid must work efficiently and at the same time be odor-free... nontoxic...completely harmless to *both* fatty and non-fatty food contents.

Nothing meets these requirements better than vinyl plastisol liners made with safe, low-cost Citroflex® A-4 plasticizer.

Citroflex A-4 also finds excellent use in plasticizing vinyls for coating food containers and for producing food wrap films. Citroflex A-2, a companion product, is a nontoxic, odorless plasticizer for cellulose acetate food wraps for both fatty and non-fatty foods. Both Citroflex A-2 and A-4 are accepted by the Food and Drug Administration.

Your Pfizer representative will be glad to explain how Citroflex plasticizers can serve your needs.

Costs of these citric acid esters are remarkably low, compared to other nontoxic plasticizers. Besides A-2 and A-4, the Pfizer Citroflex line includes Citroflex 2 (Triethyl Citrate), Citroflex 4 (Tributyl Citrate) and Citroflex A-8 (Acetyl Tri-2-Ethylhexyl Citrate). Check into the Pfizer Citroflex plasticizers today.

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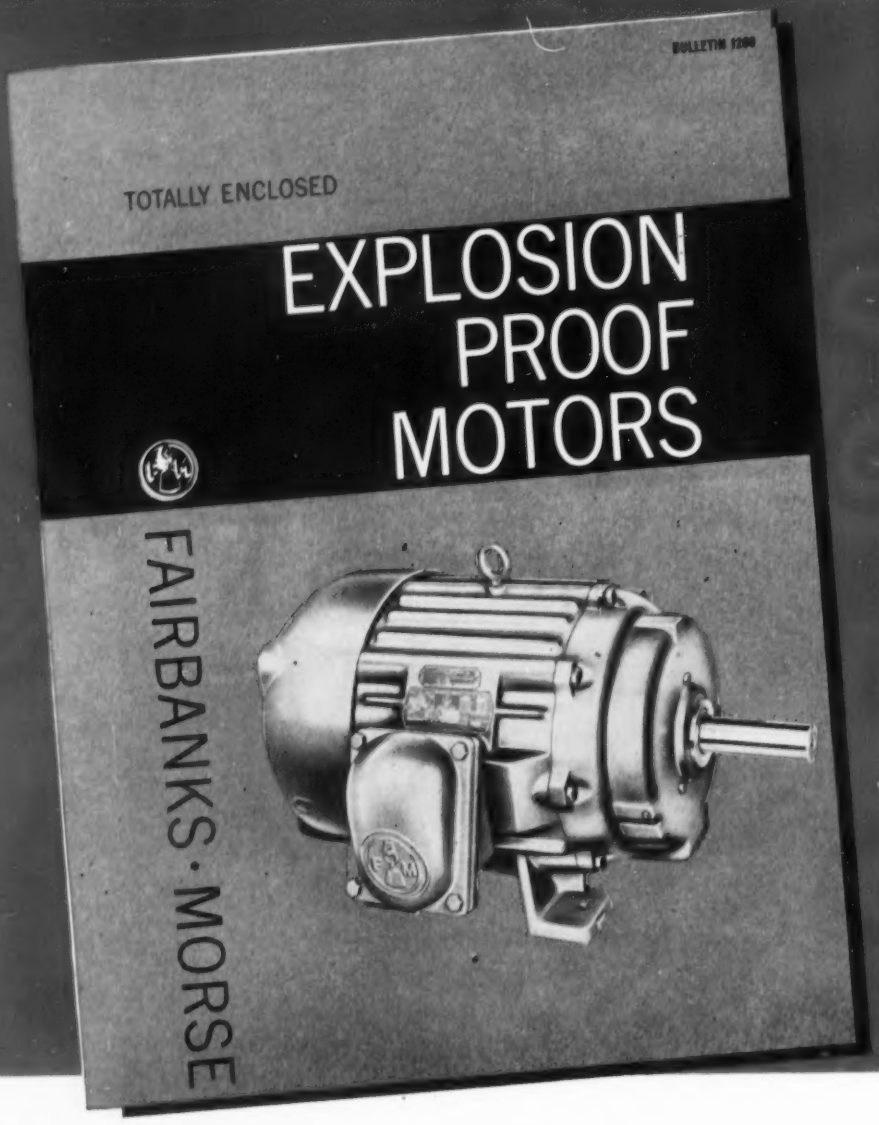
For more data, circle this page number on card at back →

NEWEST MOTOR TO CARRY UNDERWRITERS' LABEL



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EXPLOSION PROOF

All new inside and out—new, rugged frame design . . . for new, improved performance in all Class I, Group D, and Class II, Group E, F and G hazardous locations.

Get full information . . . send for Bulletin 1200 on new Fairbanks-Morse line of totally enclosed, explosion-proof motors. Write today: Fairbanks, Morse & Co., Dept. FE-10, Chicago 5, Ill.

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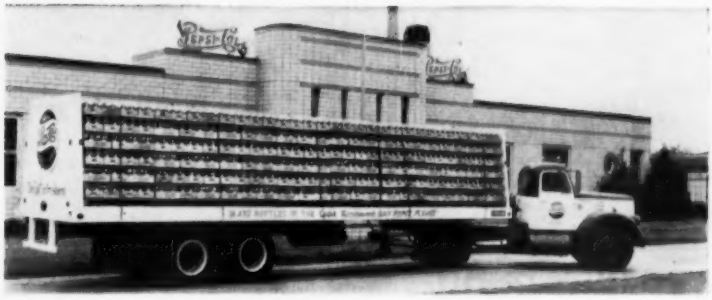
a name worth remembering when you want the BEST

ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES AND ENGINES • PUMPS • SCALES • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS



Bottler Gets New Open Truck

Over-the-road shipment of bottled soft drinks is facilitated by a new open truck, built for Pepsi-Cola Bottlers, Inc., by the Kingham Trailer Co., Louisville, Ky. The 34-ft. trailer, which has a permanent steel separator similar to city delivery units, hauls 18,432 bottles at a crack.

BRIEFLY

• POPULAR CANDY BAR from Britain will be marketed in the U. S. and Canada, starting this Fall, according to the maker, William McDonald & Sons Ltd. Named "Kiltie", the product is a milk-chocolate-covered biscuit with a sandwich filling.

• MINUTE MAID has formed a new citrus cooperative, representing 5,000,000 to 6,000,000 boxes of fruit, to serve as its principle supplier and stabilize prices.

• FROZEN POTATO PRODUCTS will be boosted by a new, and as yet unnamed, trade association, according to organizing committee chairman Leon Jones, J. R. Simplot Co., Caldwell, Idaho.

• METAL CAN OUTPUT has dipped slightly during the first half of '57, according to American Can Co. officials. Delayed food packs are blamed.

• CANNED FOODS are safe for public consumption in the event of an atomic attack, declares an official report, just released by the Office of Technical Services, Dept. of Commerce.

• HOW NUTRITION problems have been solved in this country over the past century is graphically traced in a new Borden film, *Hail to the Hearty*.

• COBALT 60 for research and development applications has undergone a dramatic drop in price—ranging from 50 to 70%—according to a prime supplier, Nuclear Systems, Div. of The Budd Co.

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to the *Federal Register*.

Rice & related products, enriched, FDA Standards of Identity, *F. R.*, Aug. 27, p. 6887.

Virginia type peanuts, shelled,

Schedule of Events

October

20-25—International Assn. of Ice Cream Mfrs., Dairy Industries Supply Assn., and Milk Industry Foundation; joint annual convention; Fairmont, Mark Hopkins, and Sheraton-Palace Hotels, San Francisco.

21-25—National Safety Congress & Exposition; Conrad Hilton, Congress, La Salle, Morrison, and Hamilton Hotels, Chicago.

22-25—American Dietetic Assn., annual meeting & exhibit; Dinner Key Auditorium, Miami, Fla.

22—National Assn. of Wholesale Pie Bakers, annual meeting; Hotel Sherman, Chicago.

23-25—National Pickle Packers Assn., annual meeting; Drake Hotel, Chicago.

24-26—National Pretzel Bakers Institute, annual meeting; Sheraton Belvedere Hotel, Baltimore.

28-30—Packaging Institute, annual forum; Statler Hotel, New York City.

28-31—Society of Industrial Packaging & Materials Handling Engineers, national exposition; Convention Hall, Atlantic City.

November

11-12—American Corn Millers Federation, annual meeting; La Salle Hotel, Chicago.

11-13—Grocery Mfrs. of America, annual meeting; Waldorf-Astoria Hotel, New York City.

11-14—American Bottlers of Carbonated Beverages, annual convention & exposition; National Guard Armory, Wash., D. C.

11-15—American Public Health Assn., annual meeting; Cleveland Public Auditorium.

14-16—American Society of Refrigerating Engineers, semi-annual meeting; Shoreland Hotel, Chicago.

17-21—Master Brewers Assn. of America, annual convention; Hotels Fontainebleau & Eden Roc, Miami Beach, Fla.

18-21—Air Conditioning & Refrigeration Exposition; International Amphitheater, Chicago.

lubrication at high speeds

These LUBRIPLATE Lubricants provide the all-necessary lubrication for those modern, high speed machines operating up to 30,000 revolutions per minute.

LUBRIPLATE
No. 205—A superior and protective lubricant for anti-friction and plain sleeve grease type bearings, operating at speeds in excess of 5000 R.P.M. Widely used for lubrication of high speed bearings on woodworking machines, textile spindles, grinder arbors, etc.

LUBRIPLATE
Nos. 0, 1 and 2 are highly specialized light fluid type lubricants with high film strength. Their characteristics are excellent at both low and elevated temperatures. May be applied by conventional means.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

THE PENNSYLVANIA PLAN:

100% financing for your new plant

Complete financing for Lease-Purchase of a new plant is available in labor-surplus areas of Pennsylvania through combined efforts of lending institutions, non-profit community organizations and the Pennsylvania Industrial Development Authority. Interest as low as 2%, with deferred amortization, can be applied on up to one-half of total plant cost.

100% financing is also available in other areas of the State, provided by community organizations, banks, insurance companies and other sources. You select the community you want. You specify plant construction details or choose one of several plant "shells" now being readied for completion.

100% Financing at a glance . . . Industrial Plant Construction Costs—

Subscribed by local non-profit community sponsored builder-owner corporations.	*20%*
2nd Mortgage Loan, Pennsylvania Industrial Development Authority.	*30%*
1st Mortgage Loan obtained from banks, insurance companies and similar lending institutions.	*50%*
Total financing, secured through local subscriptions and mortgage loans, without cash investment by the manufacturer.	*100%*

For free copy of "Plant Location Services" pamphlet, or for details on 100% financing, write or call:

Pennsylvania Department of Commerce
Main Capitol Building
923 State Street, Harrisburg, Pa.
Phone: CEdar 4-2912

FDA Standards of Identity, *F. R.*, Aug. 30, p. 6985.

On raw agricultural commodities, tolerances of Aldrin, Dieldrin, & Endrin, withdrawal of petition, *F. R.*, Aug. 16, p. 6595.

On strawberries, tolerances of sodium dehydroacetate, *F. R.*, Aug. 28, p. 6934.

On broccoli, cabbage, cauliflower, sweet corn, and tomatoes, tolerances of 0, 0-diethyl 0-(2-isopropyl-4-methyl-6-pyrmidinyl)-prosphoro-thioate, *F. R.*, Aug. 28, p. 6935.

On barley, corn, oats, peanuts, rice, rye, sorghum, and wheat, tolerances of Malathion, *F. R.*, Aug. 31, p. 7058.

On barley, buckwheat, corn, oats, rice, rye, grain sorghum and wheat, exemption from tolerances, *F. R.*, Aug. 31, p. 7050.

On barley, corn, grain sorghum, milo, oats, rye, and wheat, tolerances of Allethrin, *F. R.*, Sept. 7, p. 7185.

On celery, peaches, strawberries, apples, and tomatoes, tolerances of Thiram, *F. R.*, Sept. 11, p. 7239.

On avocados, tolerances of Monuron, *F. R.*, Sept. 13, p. 7315.

On apples, tolerances of manganous dimethyldithiocarbamato, *F. R.*, Sept. 13, p. 7315.

Ton-Tex Pur-O-Tex is a white, non-toxic conveyor belt built for food processors and canners. It resists oil, heat and water. Does not impart odor or taste to unpackaged food products conveyed. Pur-O-Tex can be washed and kept clean. Has minimum shrinkage, runs true and lasts longer. Let us tell you more about Pur-O-Tex. . . It is permanently pliable, can be vulcanized endless. Write for 20-page catalog today.

Other TON-TEX Belts for conveyor jobs

WHITE CONVEYOR handles fruits, vegetables, and food products free from oils.

STANDARD for food products, cans, bottles and light, non-abrasive containers and materials.

CLAW TOP resists abrasion, moisture. Conveys packages, cartons up or down inclines.

TON-TEX CORPORATION, GRAND RAPIDS 2, MICH.

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TON-TEX CONVEYOR AND TRANSMISSION BELTING

TON TEX

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Every Kind

Quick Delivery

Plates, Structurals, Bars, Sheets, Tubes, etc. Carbon, Alloy, Stainless Steels, Babbitt Metal.

RYERSON

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Wallingford, Conn., Philadelphia, Charlotte, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Milwaukee, Chicago, St. Louis, Seattle, Spokane, Los Angeles, San Francisco

However you **can** *apples...*

put the taste appeal inside and the sales appeal outside

and you can with CROWN—quality containers, when and where you want them, to suit your production schedules—cans for apple juice, sauce, bite-size chunks, or baked apples.

Complete package design and merchandising assistance . . . modern lithography equipment and techniques . . . experienced research and engineering service . . . all come with that extra touch of CROWN personal attention.

Write for your copy of CROWN's new booklet, "Crown Art and Lithography." Crown Cork & Seal Company, Inc., Can Division, 9324 Ashton Road, Philadelphia 36, Pa.

whatever you can . . . call on CROWN

CROWN CORK & SEAL COMPANY, INC.
MANUFACTURERS OF CLOSURES, CONTAINERS AND MACHINERY

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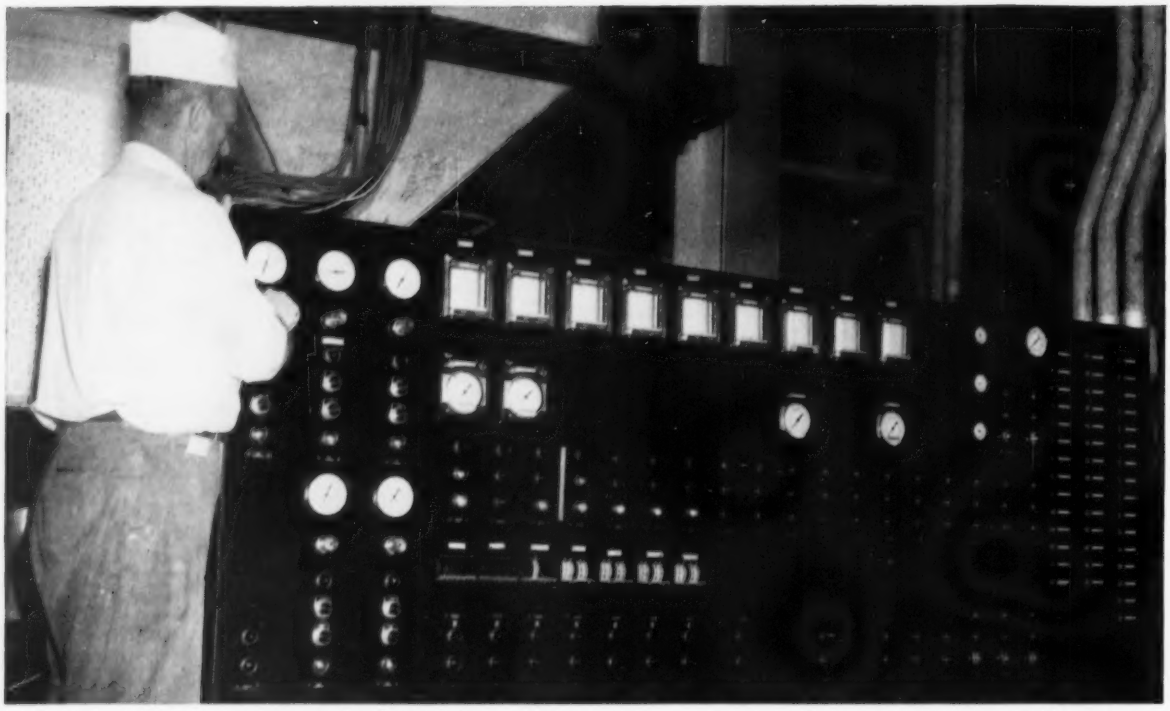
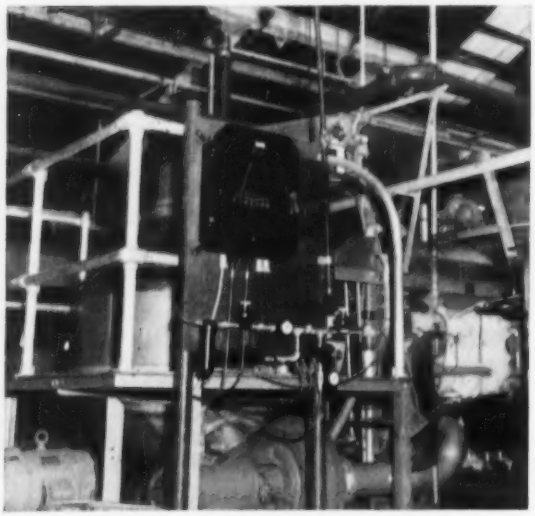
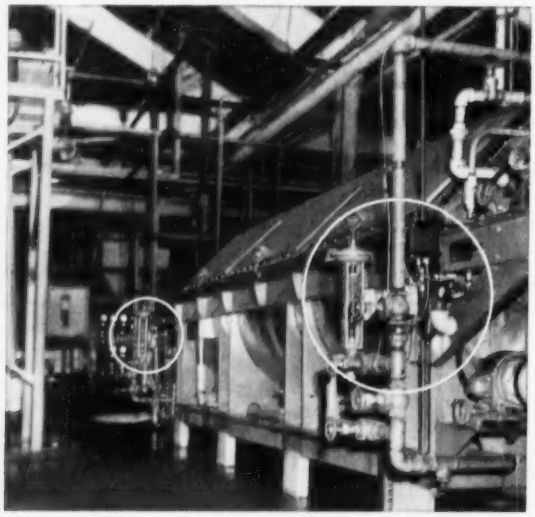
The Canning Process



In the above illustration the operator is adjusting the speed of the remote pea elevator at the central control panel. This panel uses miniature recorders and indicators with plug-in controllers and indicates the levels in the remote hoppers by signal lights.



This double-duty level controller is controlling the levels in the pre-treatment and separator tanks on a Key Washer for processing peas and lima beans.



Illustrated is a Food Machinery Pea Blancher with Taylor TRANSAIRE temperature transmitters — also shown are the steam control valves.

*Reg. U.S. Pat. Off.

Taylor Instruments MEAN ACCURACY FIRST

Becomes Automatic at Libby, McNeill & Libby

OF CANADA LIMITED

NOW! TAYLOR SYSTEM BRINGS ADVANCED AUTOMATION TO THE CANNING INDUSTRY

THESE photographs were taken in the plant of Libby, McNeill & Libby of Canada Limited, Wallaceburg, Ontario, and show the first completely automatic control system in the Canadian canning industry. This installation was evolved cooperatively by the Food Machinery Company of Hamilton, Ont. and Taylor Instrument Companies of Canada Limited. It brings to food processing the advances in automation that have been developed in the chemical, petroleum and other continuous process industries in recent years.

The various canning lines at Wallaceburg are so designed that Taylor instruments provide efficiency, quality preservation, as well as capacity for handling large volumes of food. The flow and processing of food products is measured through a system of locally mounted instruments, transmitting to a control panel located on the main floor.

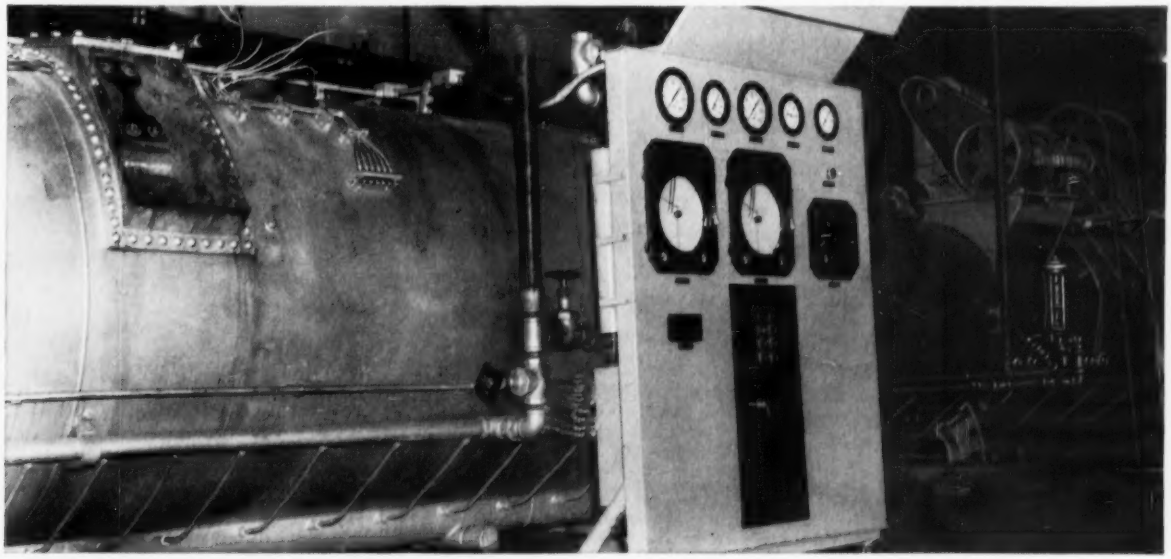
The panel tells the plant management that proper product flow is being maintained—it shows which hopper is full, half full or nearly empty. It also indicates which closing machine is operating at full speed or not operating at all.

A smaller panel on the next floor enables the foreman to maintain uniform flow to the filling hoppers. The operator at the main panel can then adjust line speed to give maximum uniform production, keeping load changes to a minimum.

Temperature measurements in the canning processes are by TRANSAIRE* Transmitters. Control, indication and/or record of temperatures and pressures at the various stages are accomplished by means of Taylor TRANSET* System of miniature instrumentation.

Benefits from this system: closer quality control with minimum spoilage; considerable savings in consumption of steam and water; minimum operator attention; a convenient, intelligence center for supervision.

Ask your Taylor Field Engineer for further information about this new development in canning control or write for **Catalog 500.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.



A continuous pressure-cooker-cooler—using Taylor controls to maintain pre-heating, cooking and cooling temperatures.

Taylor Instruments **MEAN ACCURACY FIRST**

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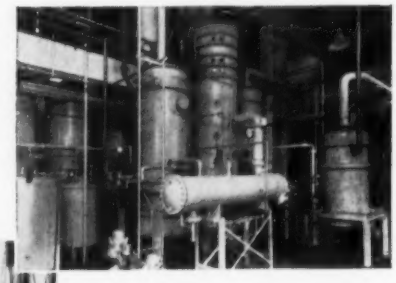
SOLUBLIZED *Pepperoyal*®

Hi-Fi Flavor

In seasonings, as in recorded music, "HI-FI" denotes a definite and enjoyable difference in quality.

Compare Griffith's Solublized PEPPEROYAL with any soluble pepper. Compare it for purity of flavor! . . . for potency of flavor! . . . for uniformity of flavor! You'll find the flavor of PEPPEROYAL exceptional—constantly and exclusively "HI-FI" in quality. That's an important advantage to you as a user.



"High Fidelity" Flavor naturally comes from prime quality spices. But, its real distinctiveness originates here with The Griffith Laboratories' exclusive process of controlled flavor extraction.

THE *Griffith* LABORATORIES, INC.

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MEN & COMPANIES

Personnel

Arthur Broadwin is now assistant chief of the USDA's southwest regional information office.

Holman R. Cloud, director and former v.-p. Florida operations, is new Minute Maid executive v.-p. Three new directors are **Daniel Draper** v.-p., **Ben Hill Griffin,** and **Hamilton Stone,** v.-p. sales.

Frank P. Crandon has been elected president of National Cranberry Assn., and **Charles L. Lewis,** 1st v.-p. Also **Ambrose E. Stevens** was appointed executive v.-p. and general manager.

Oscar H. Curry assumes job of v.-p. for administrative planning at Campbell Soup Co., with **C. Roger Stegmaier** becoming comptroller.

William B. Dugan at Van Camp Sea Food Co., Terminal Island, Calif., steps up to the job of v.-p. and director of sales advertising.

Eugene A. Lesher becomes v.-p. in charge of national sales for Boyle-Midway, Inc.

Maurice J. O'Reilly heads new special projects section at Borden Co., and **Edward P. Murphy, Jr.** replaces him in charge of financial section of public relations department.

Charles D. Ormsby has been appointed assistant secretary of General Foods Corp.

B. E. Richmond succeeds his

Dr. Ira I. Somers
—Targets 'Closer Touch' in NCA Research

Named to National Canners Assn.'s newly-created post of director of research, at its Washington headquarters, Dr. Ira I. Somers is now working to bring NCA's laboratory activities into closer touch with research needs of canning companies, exploring their problems and setting in motion programs to meet them.

Holder of a Ph.D. in plant physiology from Rutgers, with minors in biochemistry and physical chemistry, Dr. Somers became associated, in 1942, with the U. of California Laboratory, where he carried on canning research.

He has been a member of the NCA's scientific research staff since 1943 and associate director of its Western Research Laboratory since 1955, contributing distinguished research and publications to the fields of processing, sanitation, and quality improvement.

His development of in-plant chlorination stands as one of the major factors in improvement of cannery sanitation.

His first job association with the food technology of canning came in the summer of 1935 when Rocky Mountain Packing Corp. picked him to head its new quality control department, a position he held until entering graduate school.

NCA's appointee will be recalled by FE readers as one of the authors of "How to Assure Top Sanitation in Your Processing Equipment" (FE Jan.'52,p.71).

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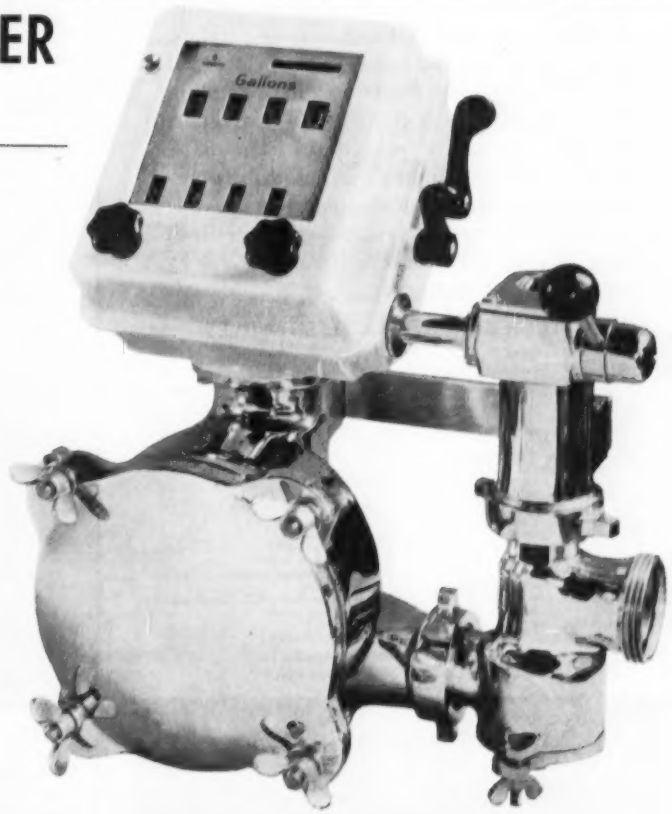

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Could this bite lead to a lawsuit?

Manufacturers of food products are sometimes the target for costly and embarrassing claims. Many can be avoided by use of an RCA Metal Detector. It's also important in defending claims to be able to cite the use of the best available preventive procedures. The RCA Metal Detector, with positive, automatic operation, helps safeguard quality, and protects your reputation. In many cases, the savings realized have quickly paid for the installation. Why not get the whole story?

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Hersey-Thomas Company, Greenville, South Carolina
High Point, North Carolina
Jones-Philbert Company, New Orleans, Louisiana
W. T. Kendall Company, Cuyahoga Falls, Ohio
Kornfeld-Thorp Electric Company, Kansas City, Missouri
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Mills Engineering Sales, Inc., Chicago, Illinois
W. W. Mills, Houston, Texas
Oneal Corporation, Jersey City, New Jersey
Henry P. Thompson Company, Cincinnati, Ohio
Western Sales Engineering Company, Salt Lake City, Utah
Lou Zumstein, Port Orange, Florida

Or write to Radio Corporation of America
Dept. Y-198, Building 15-1, Camden, N. J.

William Wood Prince, 43, is Armour & Co.'s new president. Former head of the Union Stock Yard, he had become vice-chairman of the packing firm last February. He now shares top duties with Frederick W. Specht, chairman and senior officer. Also announced is the election of R. H. Borchers, v.-p., food division, as an executive vice-president.

---

father, **E. N. Richmond,** as president of Richmond-Chase Co., San Jose. Latter becomes board chairman.

"Ollie" Seegelken moves up to post of v.-p. at California Packing Co.

Industry

Campbell Soup Co. has launched $3 million expansion program at frozen food plants located in Modesto, Calif., Salisbury, Md., and Omaha, Neb.

Consolidated Foods Corp. has sold can-making facilities of its Coastal Foods division to National Can Corp. for reported $2 million plus.

Continental Baking Co.'s new million dollar Indianapolis bakery has gone into operation.

Green Giant of Canada Ltd. will proceed with a million dollar expansion program.

Gunther Brewing Co. for third consecutive year takes the Brewer's Assn. of America's top honors in metallic label category for its bottle label and crown.

Kitchens of Sara Lee, Inc. will build $2 million bakery in Chicago, to be in full operation by next fall. Major feature will be research center, including quality control lab and experimental bakery.

McCormick & Co., Inc., Baltimore, will receive Department of Defense Reserve Award "for splendid service to our country," Charles E. Wilson, Secretary of Defense, announces.

Morningstar, Nicol, Inc. has installed foods development lab at Hawthorne, N. J.

Pepsi-Cola International has embarked on plan to decentralize abroad. New program establishes six divisions on five continents, each to be headed by a v. p.

Sandra Instant Coffee Co., will be first all-Canadian company to produce private label instant coffee. Plant to be built at Toronto will have production capacity of 3 million cups a day.

George W. Burgess, v.-p. Hawaiian Pineapple Co., heads recently established central engineering services office in San Jose, Calif. Burgess' work will deal with plant equipment and layout, processing methods, and development of new processes. **Herbert C. Cornuelle,** v.-p. in charge of plantations, will assume Burgess' former job in charge of Honolulu manufacturing operations.

If you use grains or grain products in your processing...

If you have these or related problems...

Check the ways QUAKER can help you improve quality, lower costs and increase output

1 **I need unbiased information on the best grain product for my purposes.**
Quaker mills most grains and is in the best possible position to advise you. By novel grinding, classifying and thermal processing techniques, Quaker produces grits, meals and flours with unusual properties to fit your most exacting requirements.

2 **I have specifications which are tough to meet and maintain.**
Quaker's outstanding technical facilities, long experience in processing a wide variety of grains, and precise quality control all combine to protect your product.

3 **I have too many costly rejects of flour or grain shipments.**
Quaker's control of uniformity and quality begins with the selection and classification of grains, and continues throughout the entire processing period. Quaker's rigid adherence to specifications can save you time and money.

4 **My transportation rates are high.**
Quaker has many mills. One may be near you. Check the possibility of transportation economies through pooled cars.

5 **My process involves enzymatic conversions,**
Perhaps a Quaker pregelatinized flour or meal, free of competing enzyme systems and low in microorganisms, will help you.

6 **I need more precise control over absorption, viscosity, sedimentation rate, reconstitution time, or suspending power.**
By precise control over gelatinization and by special grinding and flash drying techniques, Quaker can provide flours which thicken rapidly upon heating or other flours which exhibit very little viscosity change during heating.

7 **Contaminents in the ingredients jeopardize the sale or quality of my product.**
Quaker grains are cleaned by carefully developed processes which include electrostatic separations, aspirations, specific gravity separations, washing and classifying.

8 **Ingredient flavors are important to my product.**
Quaker can provide flours or thickeners with very mild or bland flavors which will not mask or obscure the flavors and odors of your product. Conversely, Quaker can produce meals and flours with slight toasted or popcorn flavors. These are often desirable flavor notes for canned chile, chowder, catsups, sauces, etc.

9 **Long processing times for my canned goods damage texture and flavor, and adversely reflect vitamin retention.**
Perhaps thermally processed grains or grits or flours low in thermophilic bacteria will be of value to you.

√ Check your problem here... → [1] [2] [3] [4] [5] [6] [7] [8] [9]

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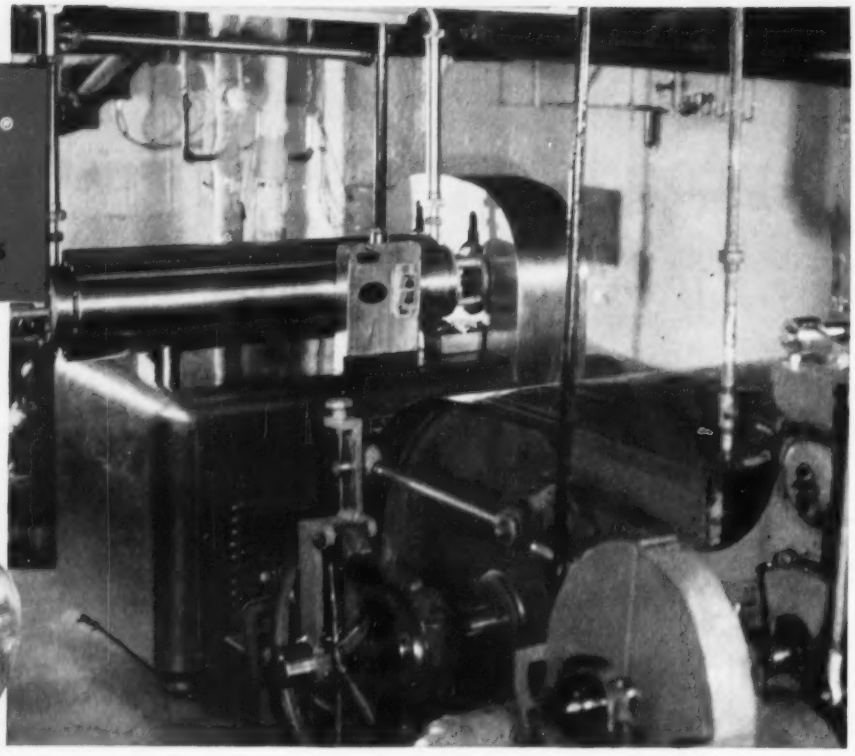

Depositing end of processing equipment, for Klein bakery bells. VOTATOR Chocolate Tempering Unit is in background.

Continuous tempering improves grain texture at Klein

UNIFORMLY fine crystal structure is now assured hour after hour, day in and day out by VOTATOR* Chocolate Tempering Apparatus at Klein Chocolate Company. The tempering operation is greatly simplified. The molten chocolate is cooled and crystallized continuously, by means of the VOTATOR Chilling Unit, to the exact tempering temperature called for by the formula, and the finished product is delivered to the point of use. Reheating and holding are eliminated. The apparatus cuts the cost of utilities and requires a minimum of maintenance. Processing variables can be quickly changed for various types of chocolate.

Write for further information on this application or on the use of VOTATOR Processing Apparatus for other food products.

*VOTATOR—Trade Mark Reg. U. S. Pat. Off.

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Cooling	Crystallizing
Slush Freezing	Aerating
Cooking	Mixing
Enzyme Inactivation	Sterilizing
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Pasteurizing	Whipping

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Dr. William G. Gordon, USDA EURDD, receives 1958 Borden Award in Chemistry of Milk, for outstanding research in the field. Gordon is now in charge of the protein structure unit of the Division's animal proteins section.

Associated Industries

Aluminum Co. of America plans light metals research center, to be known as the Foil and Packaging Div., at New Kensington, Pa. Dr. M. A. Miller has been named chief.

American Industrial Chemical Co.'s new general manager is Dr. Albert H. Cooper.

Bilek & Rowland Engineers Carmel-By-The-Sea, Calif. are new meat field consultants.

Continental Can's recently-formed Research & Engineering Div. appoints Dr. Kenneth W. Gardiner head of the general chemistry lab, and Dr. Charles J. Spiegl, director of the toxicological lab.

J. H. Day Co., Div. of The Cleveland Automatic Machine Co., opens larger, more complete customer lab service, with engineer C. F. Augspurger as head.

Du Pont Co. of Canada Ltd. plans erection of plant near Sarnia, Ont. to make linear polyethylene.

E. H. Morgan Engineering Co. has been established at Cincinnati by Edwin H. Morgan, Jr., formerly of Reflectotherm, Inc.

New president of **Instrument Society of America** is Robert F. Jeffries, assistant to the president of Daystrom, Inc., and new president-elect-secretary is Henry C. Frost, assistant chief engineer of Corn Products Refining Co., Chicago. The association bestows honorary membership, on Ralph D. Webb, head of instrument engineering, Union Carbide Chemicals, S. Charleston, West Va., for pioneering in instrument and automation field.

Heloise Parker Broeg, director of newly formed consumer service department of Coastal Foods Co., Cambridge, Md. For past 16 years, she has been "Mother Parker" of the WEII Food Fair. In 1948, GMA awarded her its Silver Trophy for tops in understanding and public interpretation of food and its importance.

Procter & Gamble Co. have elected Howard J. Morgens president, replacing Neil McElroy, whom they lost to nation's top defense post.

Sharples Corp. announces new plant opening of its English subsidiary, Sharples Centrifuges, Ltd., Camberley, Surrey.

Deaths

Charles Howard Candler, 78, director of Coca-Cola. Eldest son of founder, he joined company in 1901, then served in many capacities: V.P. from 1906, president from 1916, chairman of board 1919-20, and again president from 1920-23.

Lawrence K. Marshall, director of Wine Institute, San Francisco from its founding in 1934 until May of this year.

Domenico Viggiani, 54, president of Toronto Macaroni & Imported Food Ltd.

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ADVANCES IN TECHNOLOGY

Maraschino Cherry Process

Shortening production time is advantage claimed for patented process for making maraschino cherries.

Tree-ripened fruit are treated with a preservative, such as SO_2, then subjected to a 25-in. Hg vacuum for 15 min. at 60-140F. Cherries are flooded with 30% sugar solution and vacuum is held for another 15 min.

After breaking vacuum cherries are allowed to stand in sugar solution for 24-72 hr. then drained and packaged.—U. S. Patent 2,801,925, Aug. 6, 1957.

Improved Meat Curing

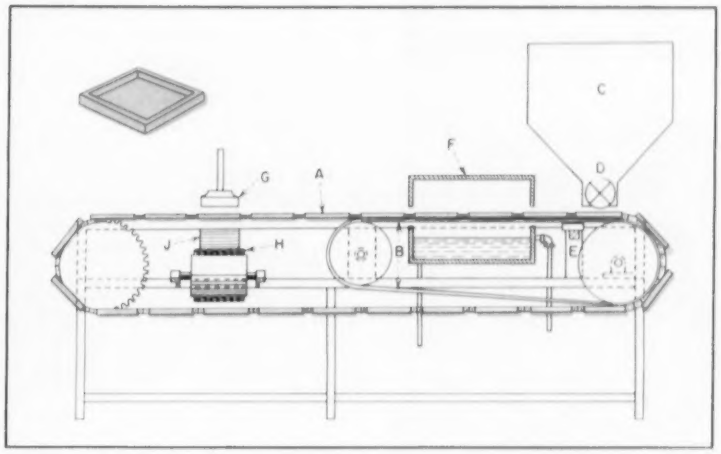
Small amounts of ascorbic acid, dihydroxy maleic acid, or edible salts thereof, when added to a meat product containing a nitrite curing salt, are claimed to reduce processing time and shrinkage, and improve appearance.

For example: 105 lb. high-grade frankfurter formula containing 0.03% sodium ascorbate (meat base) was made into an emulsion, vacumized for 5 min. at 26 in. Hg, and stuffed into artificial casings. When placed in smokehouse at 170F. for 40 min. the frankfurters exhibited good cured meat color and shrinkage loss of 8.1%. Control lot required 80 min. to exhibit the same appearance, had shrinkage loss of 12.8%.—U. S. Patent 2,797,998, July 2, 1957.

Synthetic Sausage Casing

Structureless synthetic sausage casings, made from cellulose hydrate, cellulose glycolic acid salts and similar non-albuminous starting materials can be greatly improved, by adding vegetable or animal albuminous substances, or both, to the starting paste.

The patented process makes use of such materials as gelatine, blood plasma, casein, and soya flour in finely divided form and in moderate proportion. When non-aqueous solutions, such as collodion cotton in ether alcohol, are used as the spinning paste, the albumin may be completely or partly replaced by water-soluble inorganic salts such as ammonium sulphate or common salt.—U. S. Patent 2,802,745, Aug. 13, 1957.



Non-Sticking Process Cheese Slices

Formation of relatively non-adhesive cheese leaves automatically and continuously, is accomplished in a recently patented apparatus, that features a quick-chilling of the molten product.

Apparatus comprises a sprocket-driven endless chain on which are mounted a succession of open frames (A, and inset in drawing). Directly below the chain is a belt conveyor (B) which is approximately ½ the length of the chain. It forms a bottom surface for the frames as long as they are in contact with it.

At idler end of chain is a hopper (C) which is equipped with an appropriate heating device to maintain the cheese in a molten state. Hopper has a measuring valve (D) which meters desired quantity of the molten cheese into the frames as they pass beneath it. Then frames pass over vibrator (E) that aids in distributing product evenly. Next, they go through chill tunnel (F) which is supplied with a suitable cooling medium.

Soon after a frame moves beyond the end of the conveyor belt, it passes under reciprocating plunger (G) that ejects the hardened slice onto conveyor (H), which moves at right angles to the chain. This conveyor operates intermittently, enabling slices from several frames to be formed into stacks (J), then carries the stacks to a suitable wrapping device.—U. S. Patent 2,799,856, July 16, 1957.

Dry Decaffeinated Coffee

In a patented process for removing caffein from coffee, volatile constituents are first separated from ground beans by means of steam. This is followed by the conventional brew with hot water. Caffein is removed from the brew by means of chloroform, carbon tetrachloride, benzene or other well known solvents.

Caffein-free extract is concentrated under vacuum to 20-60% solids, the volatile fraction added, and the mixture spray-dried. The powder makes a beverage of satisfactory cup strength on the basis of 1.5g. to 100 cc. hot water.—U. S. Patent 2,802,739, Aug. 13, 1957.

Milk "Pasteurized" By Centrifuging

In Germany and other European countries attempts are being made to substitute centrifugal force for commercial pasteurization as a method of reducing the bacteria counts of milk.

Employing a unit with rated capacity of 3,500 liters/hr., and developing centrifugal force approxi-

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PUMPING
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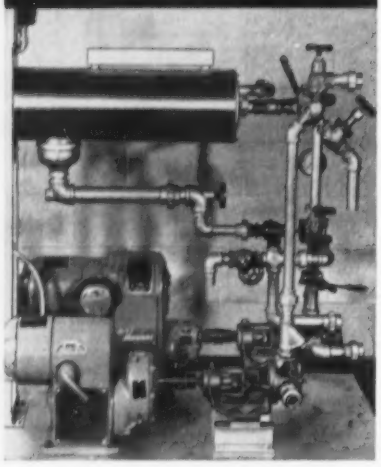

Thermal unit does successful job with Viking Pumps

Precision pumping by two Viking heavy-duty pumps contributes much to the highly successful operation of starch cooking units built by Thermal Equipment Corporation, Skokie, Illinois.

WHERE USED—Units cook starch continuously in many applications, including paper, textile, food and other fields. Example: unit easily cooks 25% paste of unmodified cornstarch.

HOW USED—With variable speed drives, the pumps are used to regulate the mixture of slurry and water in the pressure chamber. The slurry pump can be varied from 0.5 to 5.0 gallons per minute—the water pump from 5.0 to 20.0 gpm.

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Advances in Technology

mating 16,000 g., 95-98% of total bacteria present in raw milk were removed. Test was conducted with milk preheated to 123F. When the temperature was increased to 140-160F. reduction in bacterial numbers was increased still further.

The centrifuged milk was exceptionally low in spore-forming bacteria. This is attributed chiefly to their comparatively high sp. gr. (*B. subtilis* 1.105, spores 1.115). Unit had a suspended bowl and it is estimated that the milk was exposed to centrifugal force for about 1 sec.

After 2¼-2¾ hr. effectiveness fell off due to accumulation of slime in the bowl. The problem of desludging without stopping the centrifuge has to be solved.—*Milchwissenschaft*, 12, (4), 141, 1957. (In German)

Butter Spreadability

In a study of factors affecting spreadability and hardness of butter it was found that variations in cream cooling treatment, butter storage conditions, and packaging procedures had the greatest effect.

Other factors investigated included milk fat composition, type and richness of cream, type of churn, working temperature, and butter composition. All butter samples were tempered for 48 hr. at 55.5F. before testing.

Specifically, it was found that high cream storage temperature after pasteurization (above 48F.) and low butter storage temperature (below 25F.) markedly improved the spreadability.

Each factor acted independently of the other, and the effect was cumulative. It was also found that packaging procedure tends to rework butter and break up reticular structures that may have been formed, as well as preventing the formation of any new unyielding crystalline structures.—*J. of Dairy Science*, 839-46, July 1957.

Films Found Satisfactory For Orange Juice Packs

Heat processed single strength or concentrated orange juice, packaged in aluminum-polyethylene laminate or Saran pouches, maintains quality comparable with the canned product for at least 5 months at 36F.

And if 200 ppm. SO_2 are added, the juices packed in these films can be held at 74F. for at least 5 months.

These are findings of studies performed with single strength and 4-fold orange concentrates. Factors studied were: (1) Preservatives (SO_2, sorbic acid, sodium benzoate); (2) two storage temperatures (36 and 74F.); (3) four storage periods, and (4) five containers.

Containers tested were: Packages made from laminates of Mylar-polyethylene, cellophane-poly, aluminum foil-poly, double-wound Saran, and fruit enamel lined No. 1 cans (controls).

Juices were passed through a 0.02-in. screen finisher to remove most of the pulp, heated (single strength to 210, conc. to 220F.), filled, sealed, and immediately cooled in tap water. Packages were divided for storage at the two temperatures, and examined immediately and after 4, 12, and 20 weeks.

Samples containing sorbic acid and Na benzoate had objectionable off-flavors after a few weeks storage so these preservatives were eliminated. SO_2 prevented color deterioration in the film packaged products and did not produce off-flavors.

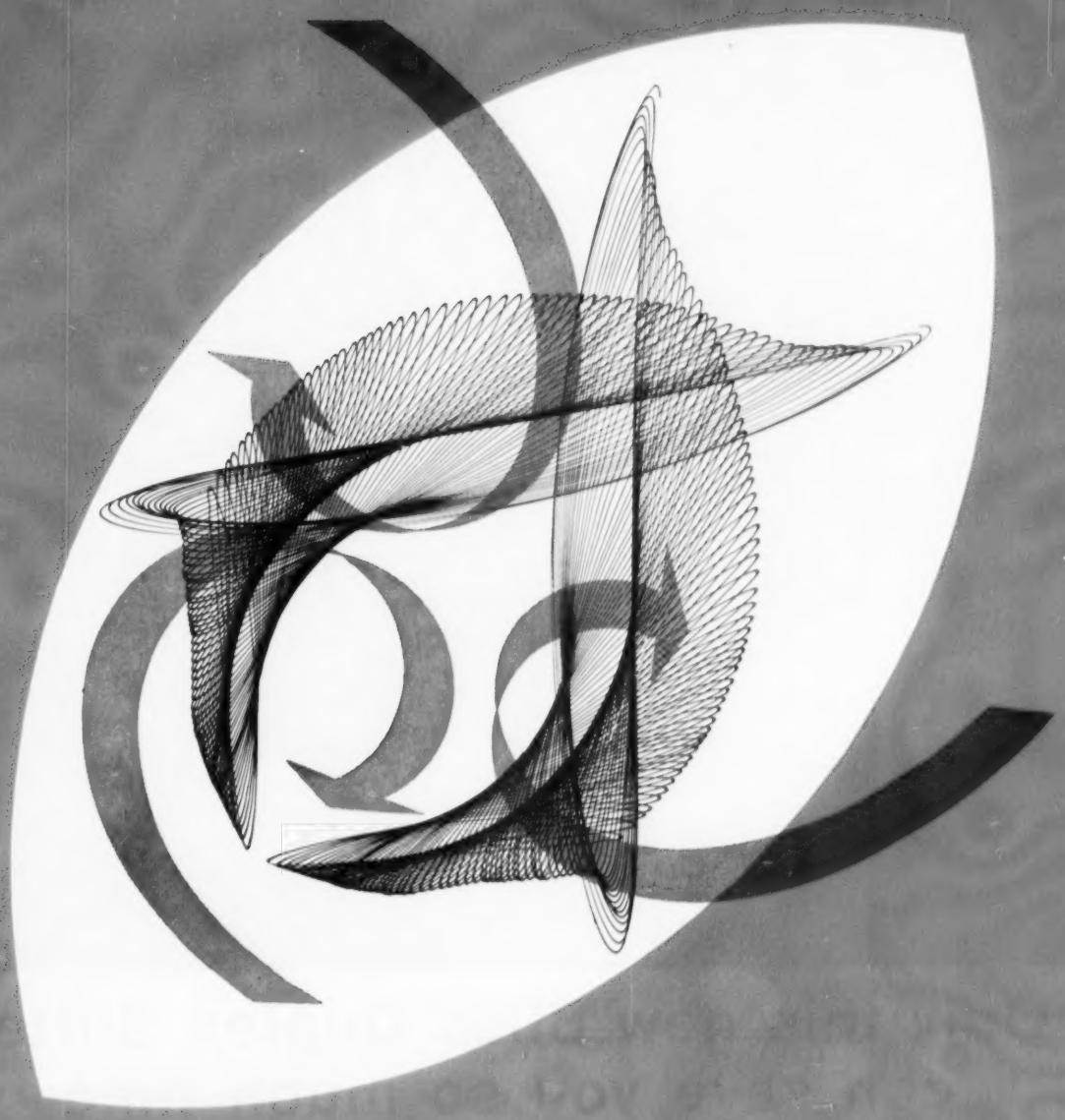
The Saran and Al-poly pouches were significantly better than the Mylar-poly and cello-poly ones, both for retention of flavor and color, and weight.—*Food Technology*, 417-26, Aug. 1957.

Bacteria In Chicken Pies

Alternate freezing and thawing of frozen chicken pies will not increase bacteria counts unless the thawing phase is at a temperature and time that will initiate growth.

This conclusion is based on tests in which commercially frozen pies were: (1) Held at 35.6 and 44.6F. for 48 hr. and examined at regular intervals; (2) held at various temperatures between 35.6 and 89.6F. for up to 40 hr., and (3) passed through 4 alternate freezing and thawing cycles. In the latter test, duplicate samples were held for 8 and 12 hr. at thawing temperatures of 35.6, 44.6, 64.6, 69.8, and 89.6F.

Little change in total flora was found when samples were held at 35.6 and 44.6F. up to 48 hr. But at higher temperatures appreciable growth was evident after 8-10 hr. With alternate freezing and thawing at 8-hr. intervals, no appreciable increase was noted if thawing temperature was held at 64.4 or less. Even at 69.8, counts didn't increase until the 3rd cycle. At 89.6, however, a



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This accessibility also simplifies set-ups and changeovers. And making things even easier is the exclusive design of the bearing housings—they're quickly removed, easily replaced. The side and back gages, too, are easy to reach and adjust, speeding up the entire process.

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rapid jump was noted through each succeeding cycle.

With the 12-hr. cycle, an appreciable increase in counts was noted with all samples when the pies were passed through three freezing and thawing cycles.—*Food Technology*, 354-56, July, 1957.

Control of Bacteriophage

An active hypochlorite preparation provides the most effective sanitizing agent for control of bacteriophage in dairy plants.

This conclusion is drawn from tests made under laboratory conditions to determine the effectiveness of representative hypochlorite, quaternary, and iodophor germicides in destruction of a lactic streptococcus bacteriophage.

Sodium hypochlorite completely inactivated phage of *S. cremoris* in concentrations as low as 12.5 ppm. during a 30-sec. time interval. A concentration of 100 ppm. quaternary was required for the same degree of activity, while the iodophor was ineffective in concentrations as high as 200 ppm. during a 60-sec. time interval.

Superiority of the hypochlorite under experimental conditions suggests its use not only for phage control in dairy plants, but possibly for other food or industrial fermentations where phage is a problem.—*J. of Milk & Food Technology*, 84-87, March 1957.

Refractive Index as Control of Sugar in Fermentation

Automatic control of sugar concentration in bakers' yeast growth medium has been attempted by using refractive index of medium to control sugar input rate.

Method was moderately successful when used with synthetic medium in 50-gal. pilot fermentor. But control was lost when a 50-50 mixture of cane and beet molasses, clarified but not decolorized was used.

Sugar concentration (about 0.8% at the start) decreased with time, but it is believed this can be controlled.

Regulation is achieved by passing a beam of light through a hollow prism cell fed with fermentor liquor freed of yeast cells by passage through a continuous yeast centrifuge. As light beam is displaced by changes

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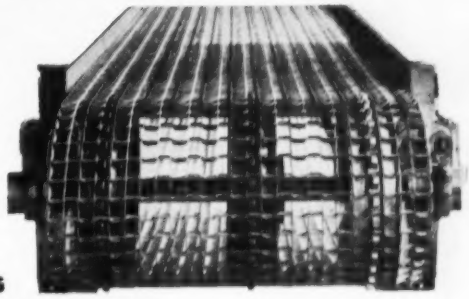

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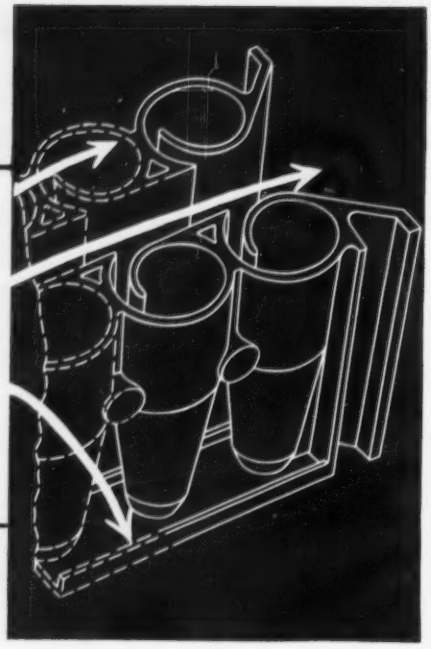

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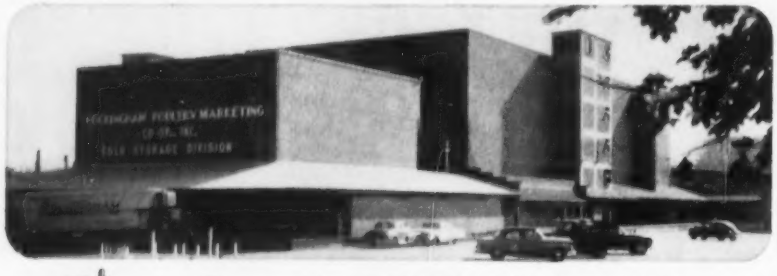

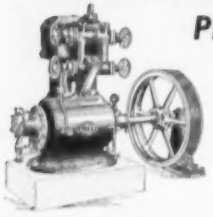

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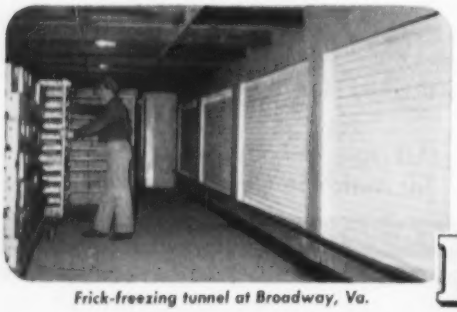

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Advances in Technology

in refractive indexes of liquor, it unbalances light field impinging on a photoelectric cell, and a servo-mechanism shifts a variable prism into the path of the beam to restore the balance. Displacement of prism is a measure of refractive index of solution which is recorded. It also actuates an air-operated feed valve controlling flow of sugar solution.—*Ind. & Eng. Chem.*, 1205-20, Aug. 1957.

Ready-to-Eat Cereal

Economy in production, retention of vitamins and minerals, and better storage properties are claimed for ready-to-eat cereals prepared by a patented process.

A grain product is cooked at 212F., or above, to raise its moisture content to about 35% and effect complete gelatinization. This causes the hulls to open slightly.

Product is cooled and dried superficially to prevent sticking while retaining a moisture content of 30-34%. It is then milled, with stones set so that only the hulls are removed and the bran left on the kernels. Small kernels that escape treatment in the first miller may be passed through additional ones.

Product is washed in hexane to remove oxidizable oils, then flavoring mixes, enriching compounds, or both are added. Kernels are then ready for final shaping, drying, and packaging.—U.S. Patent 2,801,176, July 30, 1957.

Application of Gibberellin To the Malting Industry

Gibberellin A (a mixture of A_1, A_2, and A_3) or B when applied to germinating barley increased the growth of acrospires and rootlets, and increased the alpha- and beta-amylase, protease, and catalase activity of the malt thus produced. Both materials increased alpha-amylase activity, but A affected acrospire growth while B promoted growth of rootlets.

Concentrations of 0.5-20 mg.% were effective, higher concentrations were inhibitory.

Effect was most pronounced during early part of malting growth. In latter half there was a tendency to equal the control. Worts from the treated malts were higher in N_2 and in maltrose: dextrin ratio, but the extract yield was not improved. Because response to gibberellin differs

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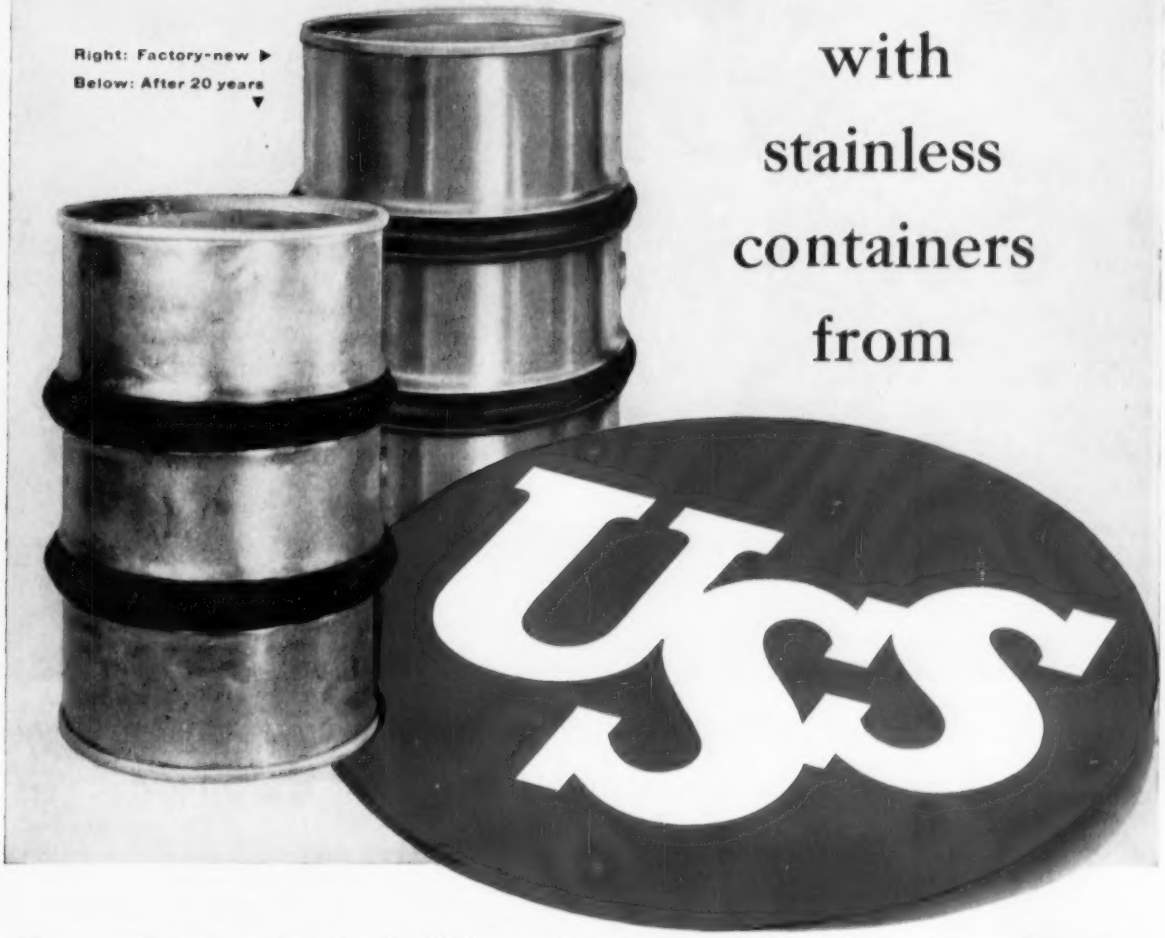

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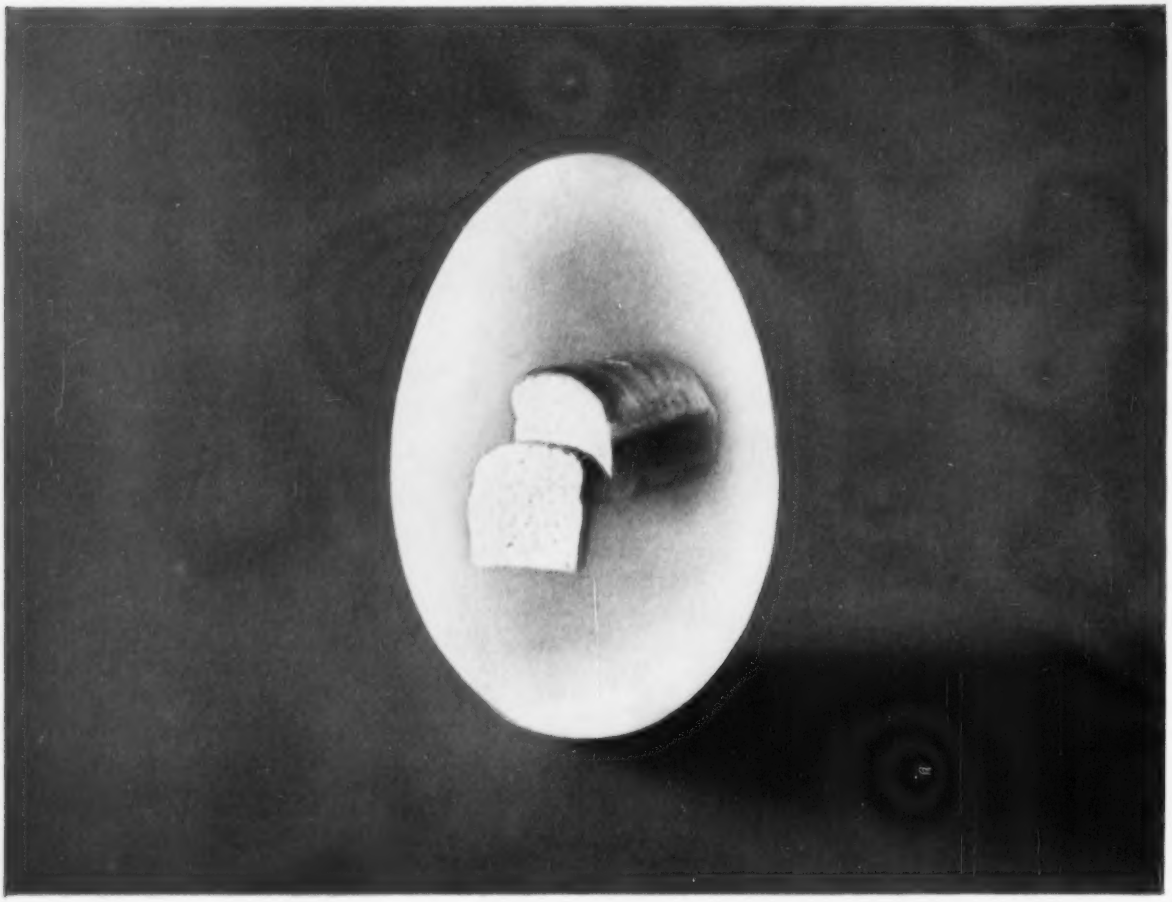


How Pfizer L-lysine can give cereal protein in your products a higher nutritional value... comparable to efficient egg protein

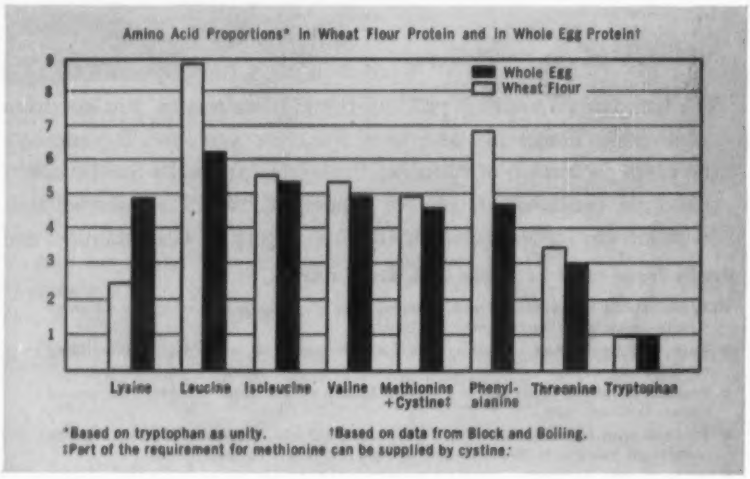
● The proteins of meat, eggs, fish and milk have high nutritional value because they contain a good balance of essential amino acids...a balance resembling that required by the body tissues. Cereal proteins, on the other hand, are unbalanced in terms of essential amino acids. The most deficient amino acid in cereal proteins is lysine.

The lysine content of wheat flour protein, for example, needs to be approximately doubled in order to make its amino acid balance comparable to that of efficient, high quality egg protein.

This lysine deficiency in cereal protein reduces the total nutritional effectiveness of products such as bread, flour and breakfast cereals. Protein is, in effect, being wasted. But now food manufacturers can correct this...can offer the public cereal products with higher nutritional value by adding PFIZER L-LYSINE.

Now is the time to experiment with PFIZER L-LYSINE* in your specialty breads, breakfast cereals, infant foods, etc. A unique Pfizer fermentation process assures that only the biologically active L-isomer lysine is produced. Write today for a free sample and technical data.

*Before adding L-lysine to food products, manufacturers should check Federal and State standards of identity.



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from one variety of barley to another, its use, while possibly improving malting efficiency, is attended by some danger.—*Bul. of Brewing Science* (Japan) Vol. 3, 1-10, 1957. (In English).

Mixing Equipment Evaluated With Radioactive Tracers

Blending studies on oils, fats and waxes in a semi-fluid (or semi-solid) state become more difficult as the fluidity of the blend decreases, and evaluation of mixing equipment for production purposes becomes less and less easy.

Oil-soluble dyes have been used for the purpose, but analysis of many samples is necessary and the product obtained is frequently unsalable because of the added dye. Now, however, radioactive iodine[128] is readily available as a tracer, and with it detailed information about mixing and blending equipment is readily obtained.

The radioactive I generator supplied by the Brookhaven National Lab. contains radioactive TeO_2 and the equilibrium amount of its decay product I^{128}.

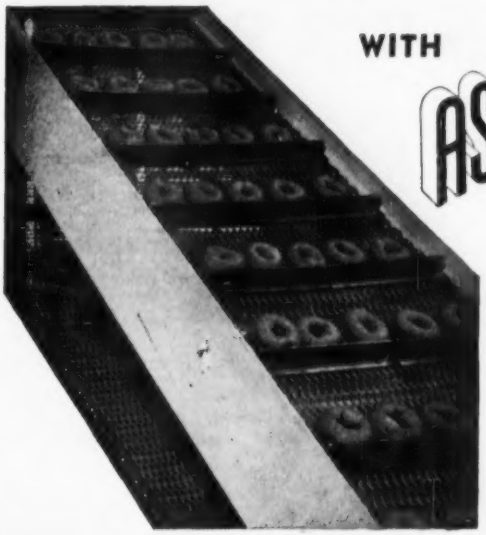
By dissolving the $Te^{132}O_2$ in Ma OH, the I^{128} is liberated and remains in solution even after the Te^{132} is reprecipitated with acetic acid. The I^{128} solution can then be used in tracer studies, due allowance being made for its decay rate.

Its short half-life of 2.33 hr., and its decay into stable Xe^{128}, makes its use relatively safe and attractive, since after 24 hr. less than 1/1000 of the initial amount of I^{128} remains. Meantime the Te^{132} precipitate (half life 77 hr.) has regenerated its equilibrium amount of I^{128} in about 12 hr. and is ready for reuse.

When the I^{128} solution is added to a mixture of fats or gels in a blender, samples taken at 1 min. intervals show wide swings in counts-per-min. (CPM) at first. As the mixture becomes uniform the CPM reaches a more or less steady value that decreases slowly along the I^{128} decay curve.

Effect of kettle and paddle shape, paddle numbers, time and speed of mixing units are readily measured, and can be adjusted for most efficient production. If mixed product is stored for 24 hr. or more before use or release, the I^{128} will have practically completely disappeared as the inert gas Xe.—*Ind. & Eng. Chem.*, 1075-78, July 1957.

Keep your product on the move



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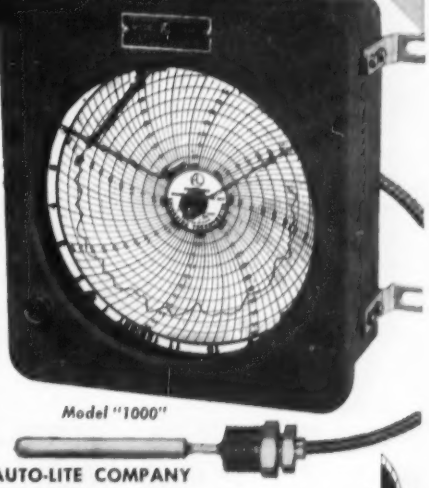

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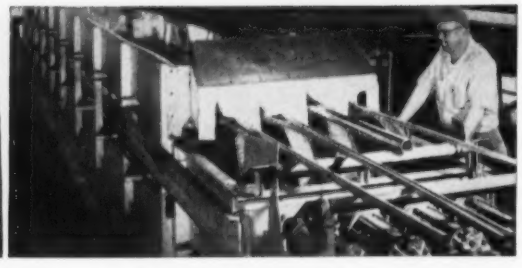

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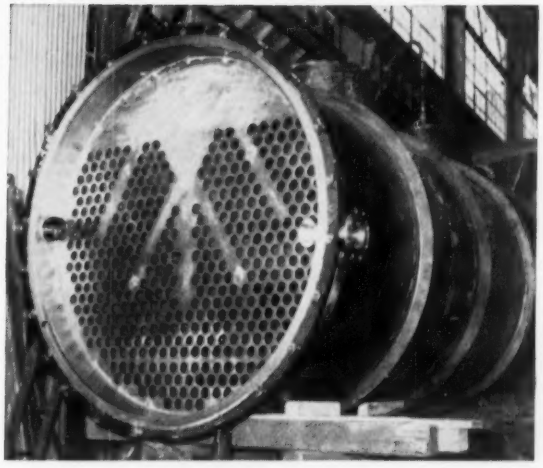

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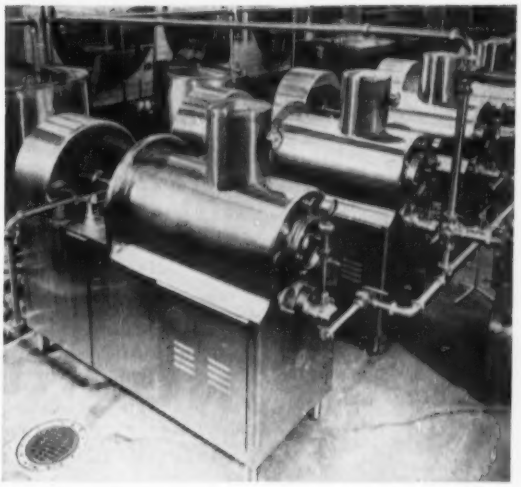

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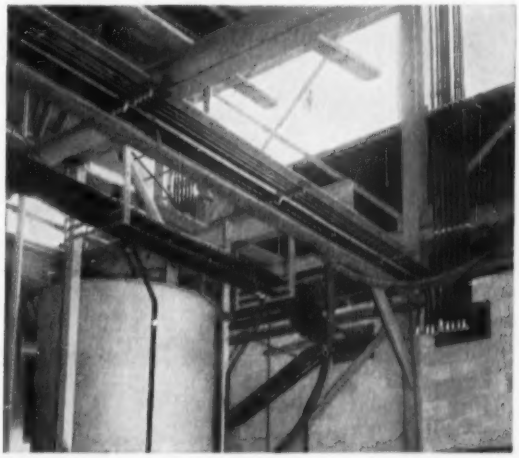

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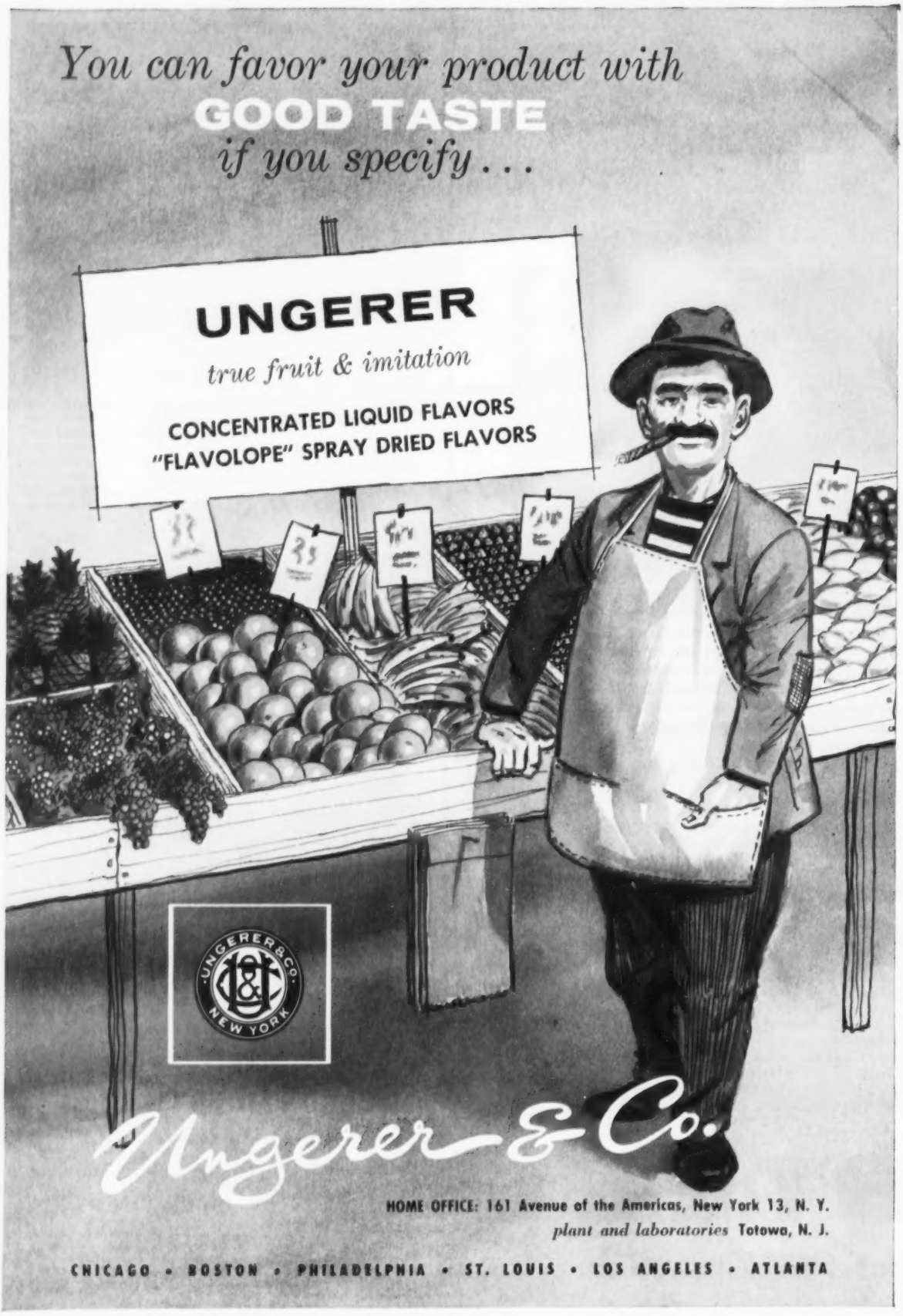
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QUESTIONS & ANSWERS

THIS MONTH'S PROBLEM

Corroding Tank

Question—We have a serious corrosion problem with a simple stainless-steel sauce tank, made for us by a local boiler shop. It is fitted with a portable electric agitator.

Though our sauce is not very corrosive (as evidenced by condition of pipelines handling the product), the tank develops pits, then it leaks and must be replaced about every two years. How can we increase its service life?

AUGUST PROBLEM

Difficulty With Slurry

Question—We make a slurry of solids in a water-like liquid, using two cylindrical open-top tanks equipped with portable 1-hp. propeller-type mixers.

Occasionally, solids accumulate in tank bottoms. Another difficulty is that some particles seem to be more easily suspended than others. Careful checking of materials, order and rate of addition to tanks, etc., reveals no variables that would account for these erratic results. Have you any suggestions?

Answer—Since there are said to be about 30 variables in mixing, your difficulty is not surprising.

For a complete analysis, it would probably be best to call in representatives of mixing-equipment companies. Meanwhile, you should carefully check your mixer and its operations.

First, since these are *portable* mixers, they may be removed frequently during cleanup. Most likely the 1-hp. motors are 3-phase. If personnel have not been fully instructed, they may re-connect the mixers improperly, causing them to rotate in the wrong direction.

Mixing efficiency is thus greatly reduced, which might explain your incomplete dispersion of solids, also the erratic nature of the problem.

Check the arrows on mixers for proper rotation. If there are none, apply decal arrows. Even better, use motor cords with 4-prong plugs. This will correct the rotation problem and provide for grounding—an important safety precaution.

Even with motors rotating correctly, agitator shafts may be inserted at the wrong angle. Study the blades' angle to see how they must turn to give *downward* thrust.

If rotation must be *clockwise* (looking down on motor), then angle the agitator shaft to the *right* of tank center, and vice versa. Explain this rule to all personnel concerned with mixing.

A third source of improper performance might be replacing propellers on the shaft upside down. This would also reduce mixing efficiency and might allow settling of solids.

For mixing lighter solids, have agitator shaft on center-line of tank. This creates a vortex which forces solids into the liquid. You might start mixing with shafts on center-line, then angle the shafts to mix the heavier solids.

Another Answer

We suggest recirculating the slurry from mixing tank to a small attrition mill, which will continuously blend the ingredients. Mill's two plates rotate rapidly in opposite directions to produce shearing action. Different types of plates are available for particular materials.

This method gives rapid, uniform mixing.—*The Bauer Bros. Co., N.Y.C.*

More on Fuel Problem

A "heat balance," as proposed in your July problem, p. 152, is made on a power plant to determine operating efficiency, and to detect causes of inefficiency. Such a test measures energy entering and leaving the system—fuel to burner, feed water to boiler, steam leaving boiler, and combustion products.

From known heating value of fuel, energy of steam, and stack losses, overall efficiency can readily be calculated.

Some special equipment is required. Flow of fuel is measured, either by a meter or by weighing the fuel used in the test. Steam flow may be conveniently gaged by weighing the condensate.

A potentiometer is essential for remote temperature measurement of stack-gas, steam, and feed water. An Orsat instrument determines composition of stack gas. With steam pressure known, a throttling calorimeter can be used to determine quality.

Performed periodically, a heat balance can lead to greater fuel economy. Analysis of stack-gas composition will reveal incomplete combustion. Stoichiometry will indicate any lack of excess air to the burner.

With solid fuel, combustible material in the ash also reveals incomplete combustion. Unaccountable energy losses will be due mainly to convection and radiation. Heavy

---

Q.—Will you supply me with directions for making a quality cream icing (about 60-lb. batch) to be applied to layer cakes?

A.—Cream for 5 min. in a beater-type mixer 40 lb. of powdered sugar, 8 lb. of shortening, 4 lb. of butter, 3 lb. of nonfat milk solids, ¼ lb. of salt, and ¼ lb. of vanilla. Then slowly add 8 lb. of water, and cream until batch is light.

HOW TO DO IT?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

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Subscribers also are invited to send in food engineering questions. We undertake to provide answers free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

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Questions & Answers

losses of this type may show need for better insulation.

Further information may be obtained from: American Boiler & Affiliated Industries, 15 Park Row, New York City; American Society for Testing Materials, 1916 Race Street, Philadelphia; and Institute of Boiler & Radiator Manufacturers, 608 5th Ave., New York City.—*Edward S. Olney, Dearfield, Ill.*

Precautions on Pies

Question—We are considering production of cream-type pies but understand that, under certain conditions, they can present food-poisoning hazards. Can you give us some general information on the danger, and preventive measures needed.

Answer—It is true that non-acid fillings made with either egg or milk can support food-poisoning bacteria. Space permits only a very general discussion in this column, but fuller exposition of this important subject is available in various books on bacteriology, and should be carefully studied before you undertake commercial production.

Food-poisoning organisms may be found in such ingredients as egg yolks, egg whites, non-fat milk solids, and cocoanut. A very important additional source of these bacteria is humans employed in the handling and production of ingredients and products. Even normal, healthy persons harbor such bacteria.

There are special dangers from persons suffering from colds or intestinal disturbances, or having infected hands caused by burns, cuts, etc. You can easily see the importance of using only high quality ingredients, of instructing employees in fundamental personal hygiene, and of assigning employees with temporary disabilities to non-critical tasks.

Fortunately, the food-poisoning types of bacteria encountered in cream-pie fillings do not form spores, and they are killed by thorough cooking (i.e., to a temperature of at least 180F.). Roughly, this temperature is attained at the center of 9-in. custard pies baked at 425F. for 30 min.

It then becomes a matter of utmost importance to make sure that once the filling is cooked, there is no re-contamination. In the case of pies filled before baking, the main consideration will be prevention of contamination by humans after baking is completed.

In the case of fillings cooked in bulk and dispensed into pre-baked shells, this type of prevention is equally important. Moreover, it is essential that the filling into shells be done immediately, while the filling is sterile, and that all vessels and utensils used be kept scrupulously clean and sterile.

Although implied above, it might be well to emphasize that no raw ingredient that might add dangerous bacteria—e.g. cocoanut—should be added *after* the batch has been cooked, because of the danger of re-contamination.

Q.—Is there any way we can machine stuff ovenready poultry rather than doing it by hand

A.—Only method we've seen so far is to use a meat chopper, stripped of knife and plate, and equipped with a stuffer attachment (U. S. Slicing Machine Co., Inc., LaPorte, Ind.). Opening of bird is sewed, legs are tied, and stuffer is inserted in neck opening. Operator then pushes dressing down the chopper's safety neck-throat.

Tuna With Noodles

Question—Do you have instructions for manufacturing tuna fish with noodles to be packed 8-oz. in heat-and-eat-type aluminum trays, frozen and sold as a casserole?

Answer—Follow these four steps in preparing this product:

1. Make a white sauce with 4 lb. of flour, 4 lb. of shortening, 6¾ oz. of salt, ¼ oz. of ground pepper, 1 teaspoon of cayenne pepper, and 48 lb. of milk.

2. Blanch 8 lb. of noodles in about 6 gal. of 212-F. water containing 6 oz. of salt.

3. Blend drained and blanched noodles with 14 lb. of tuna fish (canned), white sauce, and 1½ lb. of grated onions. Fill into foil trays.

4. Prepare a mixture containing 1 lb. of melted shortening, and 4 lb. of bread crumbs. Sprinkle over tray-packed product, and freeze.

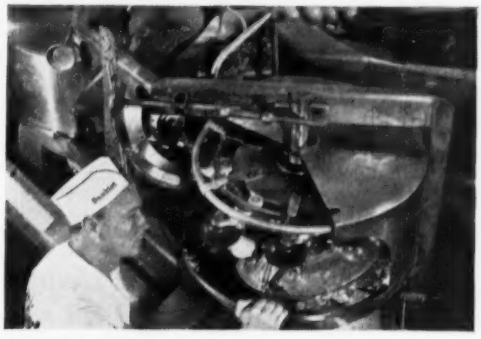
Label instructions on package for consumer to bake in oven.

Mixer Query

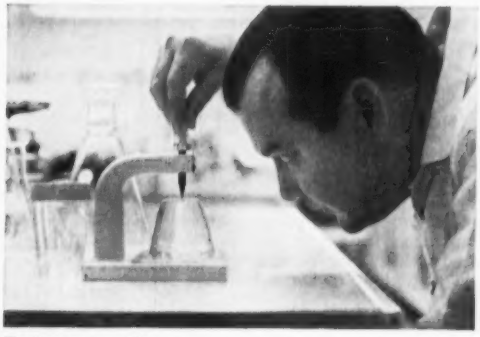
Question—Will you help settle a difference of opinion that has arisen about use of a portable propeller-type mixer? This mixer has been used for 60-gal. batches of a rather thick and creamy mix, and has proved

One look at the huge, sprawling buildings at one of the Exchange Products plants and you know that big things are happening inside. For here *citrus* is king. Trucks pour in with fresh fruit from groves all over California and Arizona. Conveyer belts hum along in every direction. And Exchange products are shipped to nearly every part of the world.

Why 'Exchange' products serve you better

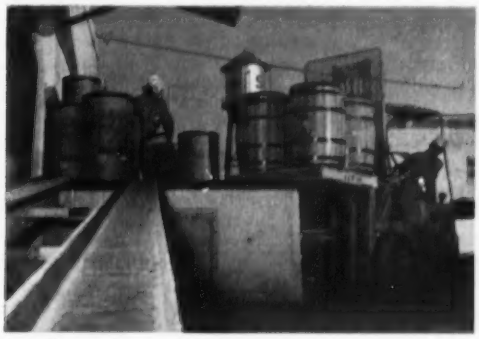


Utmost cleanliness is the watchword at Exchange Products plants. Everything has that "just washed-down" look. Every four hours, extraction equipment is completely cleaned. Every third day, the entire plant closes down for a thorough washing.



Exchange quality is assured by constant checking in extensive testing laboratories. In fact, rigid quality controls have been set up *throughout* the plant to make sure that every product measures up to Exchange quality. Sunkist produces more than 400 different citrus products.

The world's largest citrus research department is maintained by the Sunkist Growers to develop new growing methods, to improve manufacturing processes, and to perfect better products. Today, with a backlog of more than 60 years experience, Sunkist has accounted for 118 separate U.S. patents.



Just three of many Exchange products are *Exchange Preserver's Pectin*—guarantees a more uniform finished product; *Exchange Low Methoxyl Pectin*—jells *without* sugar, tasteless, controls "weeping" in pies; *Exchange Lemon Juice*—brings out natural flavor of *any* food. Superior acidulant, excellent anti-oxidant.

Sunkist Growers

PRODUCTS DEPARTMENT • ONTARIO, CALIFORNIA

Distributors for

Exchange Lemon Products Co., Corona, Calif. • Exchange Orange Products Co., Ontario, Calif.

For more data, circle this page number on card at back →

ALGIN CORPORATION OF AMERICA

ALGINATES
and
CARRAGEENATES

"The ingredients you use
BY THE PINCH
to make better products
BY THE POUND"

Marine plant extracts are no exception to the rule that the performance of a food ingredient is largely governed by its purity.

Thus, the degree of purity we have been able to impart to our super-refined alginates and carrageenates has made them dependable ingredients in a large and growing number of food products.

They are the logical choice of any food processor interested in viscosity, suspension, stabilization, or gelation. They perform these functions superbly and (as a result of their purity) with outstanding economy. For instance

1. As little as ¾ of a gram of Gelcarin® in a pint of milk forms the basis of many types of milk puddings.

2. Our Sodium Alginate is used to stabilize frostings and icings at concentrations as low as 0.1%, giving added gloss and preventing stickiness and "weeping".

Our products add no odor, no taste, and virtually no calories to the finished food product; nor do they possess any of the cloying or taste-masking properties frequently associated with many gums and starches.

Important: their use has also led to the development of a number of new and improved forms of food products with remarkable sales records.

Write. Our technical department will be glad to answer your questions. Just tell us what you feel free to divulge about your product, your method of processing, and your problem.

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Questions & Answers

satisfactory. It has 4½-in. propellers and a ½-hp. motor.

Now, it is proposed to transfer this unit to a totally different type of service—agitating the contents of a tank truck before sampling and unloading. One opinion is that such large-volume service would burn out the motor. The other is that it can easily do the job if the propellers are replaced with a new set twice the diameter. Which is correct?

Answer—Actually, neither opinion is correct in this case. There is one important bit of information missing from your question, which makes it difficult to give a hard and fast answer. It's the viscosity of the material in the tank truck, as compared to that now successfully mixed.

Manufacturers' data state that propeller-type mixers can be used in a large vat or tank, instead of a small one, without danger of motor burnout because size of batch does not affect load on the motor. This presupposes equal viscosity, because this property definitely does affect the load. In your case, you already have satisfactory agitation in a high-viscosity batch. So if the tank truck is handling something water-like, as milk or fruit juice, you should have no viscosity problem.

However, you will find that mixing in the tank truck will take more time than in the small batch. A mixer of this size is capable of blending a tank truck of milk, for example, in about 15 min. You might want to obtain a longer shaft for your mixer, so that the propellers will come closer to the tank bottom. However, it is not necessary that the shaft go all the way to the bottom.

One word of caution: Do *not* change propellers to a larger diameter, as this will surely burn out the motor in very short order. The increase in load in doubling the propeller diameter would be several fold which, of course, is entirely beyond the limits of the present mixer.

Q.—Just what does "fixed-acid content" mean in an analytical report of a questionable tank-car shipment of wine to our plant. Wine was tested by an outside-of-the-plant laboratory.

A—It's the total, less volatile acidity (calculated as tartaric acid). Volatile-acid wines are usually vinegary, and the volatile-acid content is an indication of unsoundness.

QUICK CLEAN-UP WITH METSO

Metso Cleaner is geared to fast methods. Use Metso in steam gun cleaning. Dissolves quickly, removing oil, grease and proteins. Special component also controls corrosive effect of alkali on metals.

Get free copy—"Cleaning in Food Industries".

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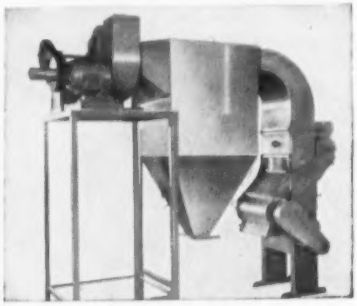
For a cleaner, more uniform product—
the NEW COMMERCIAL PNEUMATIC SEPARATOR



DESIGNED for automatic, foolproof separation of light or defective grades or chaff from raisins, green or dried lima beans, peas, dried beans, and grain, as well as all types of nuts and nut products.

For further information, on how the NEW Commercial Pneumatic Separator can improve your process and product, write, wire or phone.

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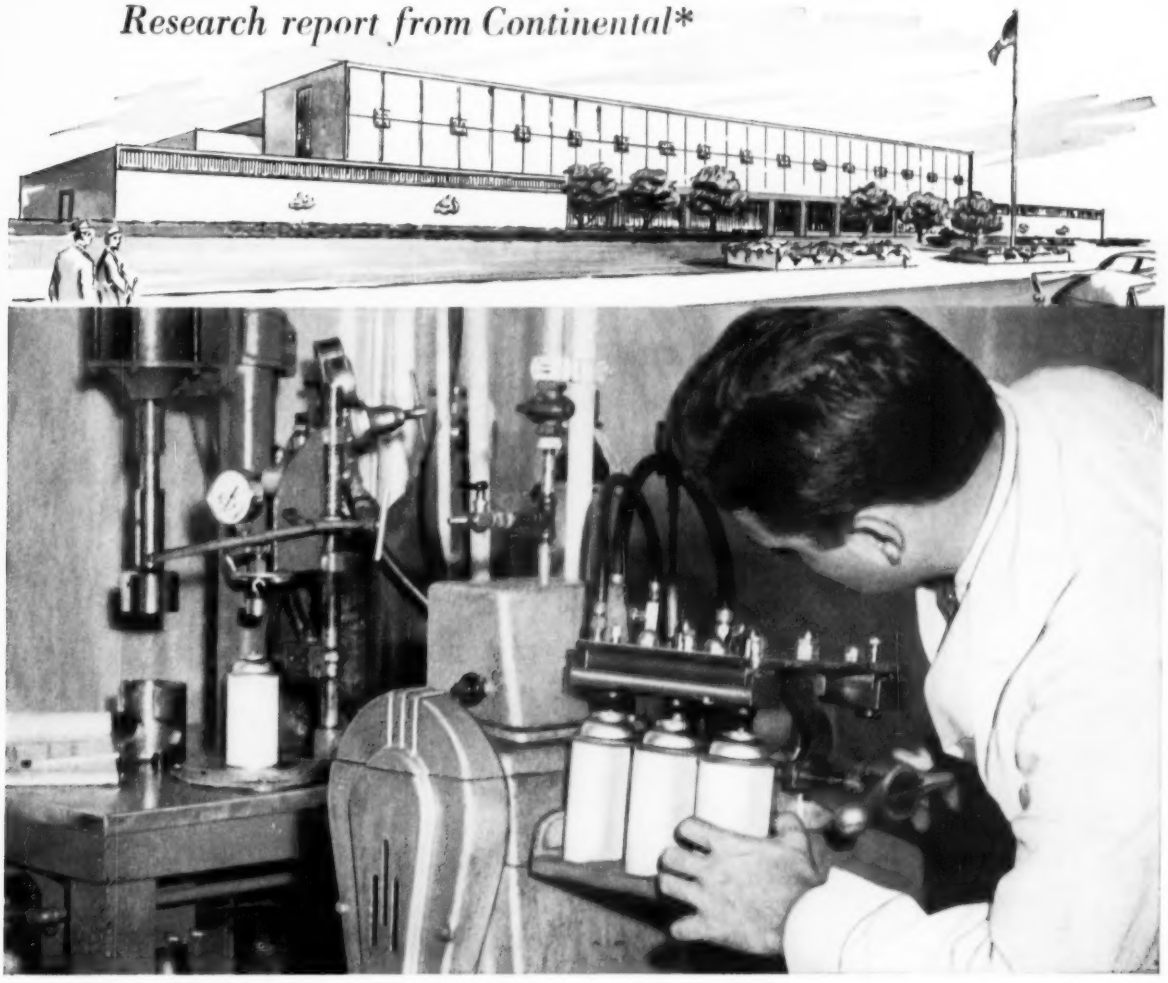
*Research report from Continental**



RESEARCH AT CONTINENTAL BREAKS THE "PRESSURIZED FOOD" BARRIER

Look for a new era in pressurized packaging, thanks to Continental research. Previously, the only marketable pressurized foodstuffs were foam products like whipped cream. Now Continental engineers have pressure packaged such foodstuffs as salad dressings, catsup, mustard, meat tenderizers and sauces, table syrups, cake toppings, and chocolate syrup.

Designing pressurized containers for these foodstuffs seemed a formidable task. Non-toxic compressed gases did not give a spray or stream pattern with known types of dispensing and left as much as 20% product residue in the container.

To overcome these obstacles, Continental engineers began sustained experimentation with numerous gas mixtures, with specially designed valve openings and actuators, and with many different food products. Pressurized food containers developed by this research dispense water-base or oil-base food products by means of non-toxic propellants in a spray or stream pattern with a minimum of aeration and product residue.

This is one more example of successful Continental research on a basic container problem. If you have a packaging or processing problem, Continental experts can help you solve it. Why not call your nearest Continental representative.

TOP AWARD WINNER. For the excellence of its modern, scientific design, Continental's new 7.5 million dollar Chicago research center has won the honor award of the Chicago chapter of the American Institute of Architects and the Chicago Association of Commerce and Industry.

QUALITY Continental SERVICE

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
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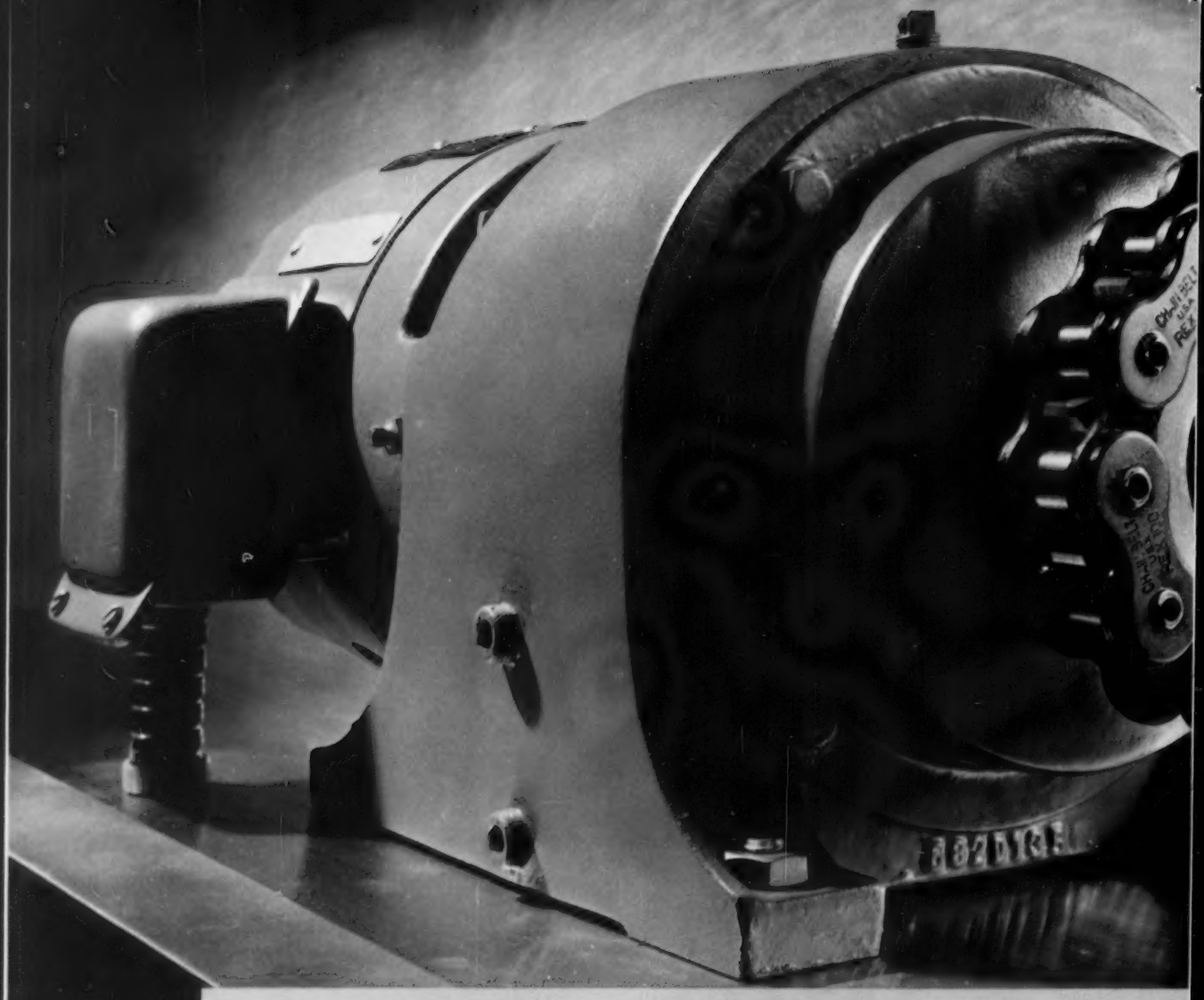
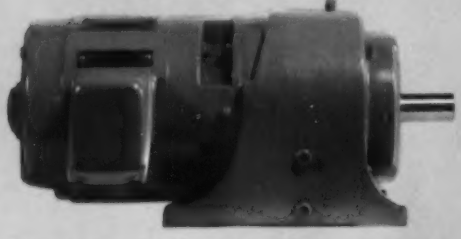
A great gear-motor

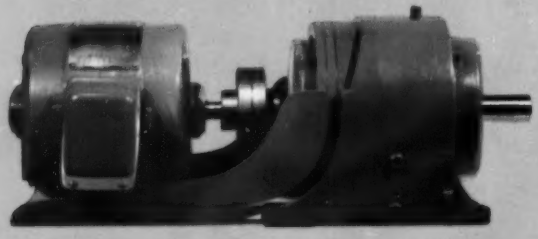


NEW integral unit



Compact, one-piece unit has complete, easily removable motor, machined-in alignment.

NEW all-motor unit



Providing wide application flexibility, motor change may be accomplished without disturbing gear.

General Electric's NEW gear-motor line

Now, you can meet all your low-speed drive requirements from a brand new line of General Electric packaged power transmissions. This 3-unit line is based on a new, completely simplified, helical design that has evolved from General Electric's 25 years of gear-motor engineering and application experience. And it's a line that can provide you with important, 3-way savings on all low-speed applications.

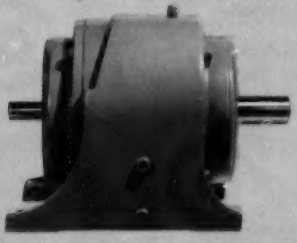
1. Greater reliability: This new line incorporates the most advanced gear manufacturing methods and all units are factory tested before shipment. In addition, you benefit because you purchase both motors and gears from a single manufacturer.

2. Easier Maintenance: A cinch to assemble and disassemble, alignment is machined right into each unit. Gear components may be carried in stock as sub-assemblies, minimizing downtime for normal repair.

3. Reduced inventory: You can reduce your inventory with no sacrifice to your operating continuity. Parts standardization and interchangeability permit a basically lower inventory investment.

This new line was developed to keep pace with the new requirements and wider applications of gear-motors brought about by advanced manufacturing techniques. *Get complete information from your nearest Apparatus Sales Office or Distributor—or write for bulletin GEA-6704, containing line highlights, to General Electric Co., section 851-6, Schenectady, N. Y.* Gear-Motor and Transmission Components Dept.

NEW separate reducer



Unit can provide a variety of output speeds with change of belt or chain rates.

Progress Is Our Most Important Product

GENERAL ELECTRIC

SELF-MEASURING PAPER FEED ON "PACKAGE" BACON WRAPPER

ELIMINATES ADJUSTMENT BETWEEN SIZES

You can alternate one-pound and half-pound packages on the Package FB-1 Bacon Wrapper without any adjustment. Using either cellophane or pliofilm, the self-measuring paper feed *pulls only the amount of* material needed for each wrap. Folding and sealing mechanism draws down a tight, flat, air-sealed package to preserve quality and increase display value. Intermittent chain flight conveyor carries individual packages, makes machine self-clearing.

Speeds on the Model FB-1 are adjustable between 20 and 50 packages a minute with a simple handwheel control. All surfaces contacting the package are sanitary stainless steel. Reciprocating sealing plates are teflon-coated to prevent the accumulation of sticky carbon and bacon grease. Self-aligning bearings and rugged steel frame help reduce down time, add to useful service life.

You can wrap in a size range from 8½" to 11½" long, 3½" to 8" wide, and ⅛" to 1" high on the Model FB-1. For full details on this bacon wrapper, which major packers have now standardized on, contact your nearest Package representative.

PACKAGE
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NEW YORK • PHILADELPHIA • BOSTON • CLEVELAND • CHICAGO • ATLANTA
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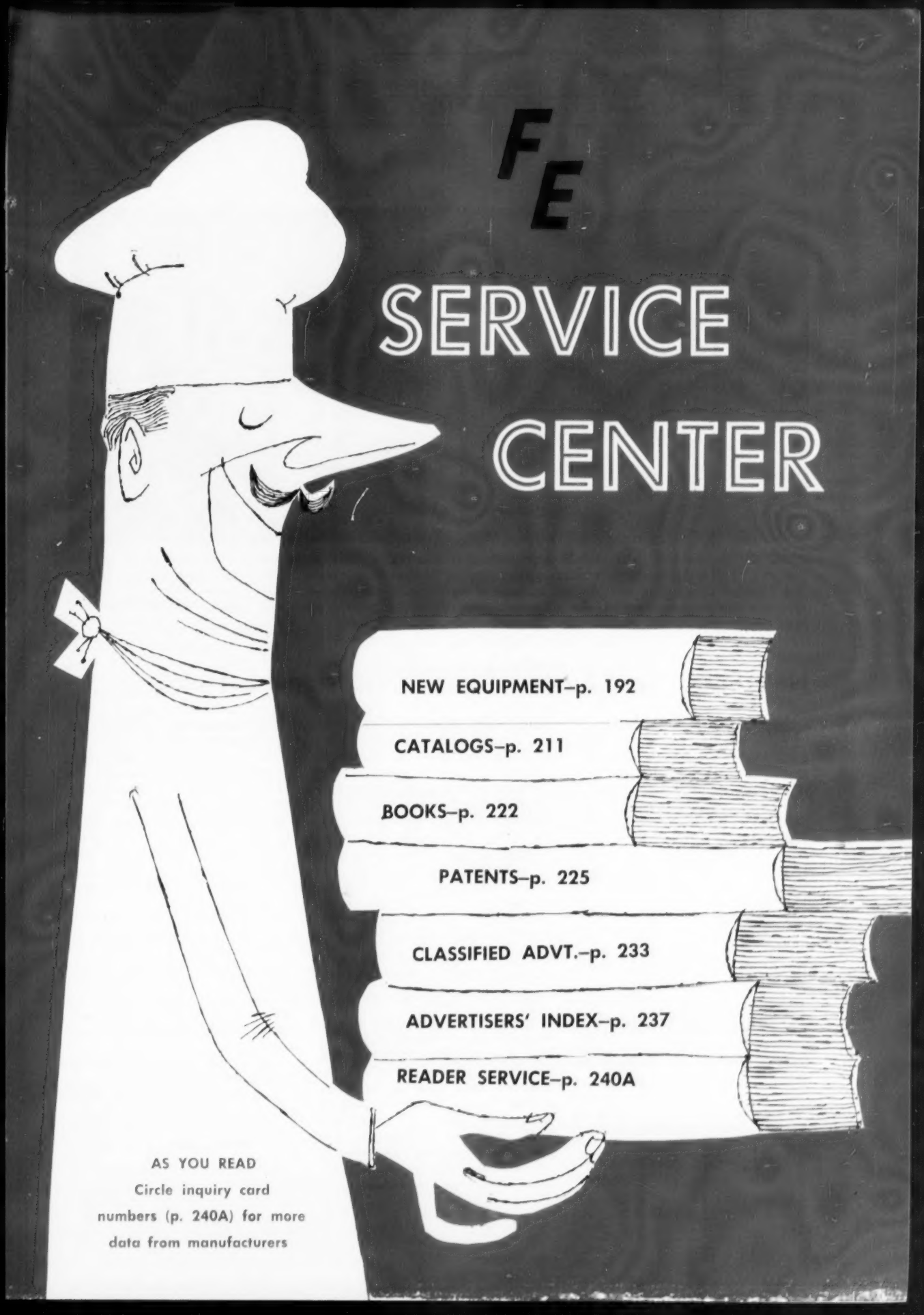
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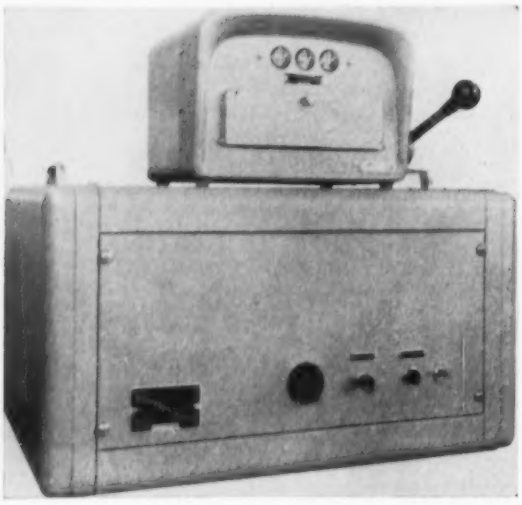
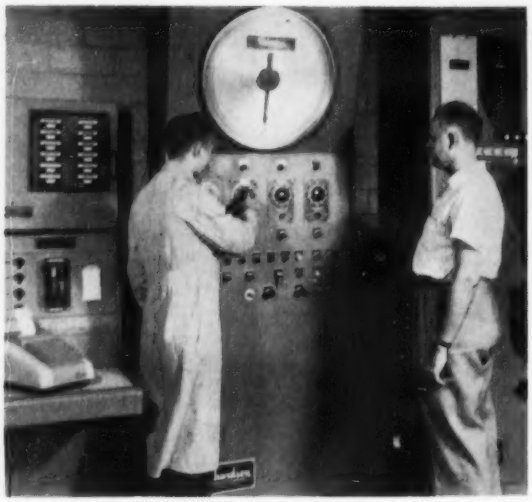
NEW EQUIPMENT & SUPPLIES



COMPACT punched-card reader controls batch weighing of bulk materials. Automatic cycle starts when pre-coded formula card is locked in at top of unit. Lighted windows at top show prescribed ingredient weights, also tell operator which batch is being run.



TYPICAL SETUP for automatic program control by new punched-card reader includes (left to right): Formulation panel with attached formula board and inventory totalizer at top, control panel with indicator dial, and portion of graphic panel.

New Punch-Card System Perfects Electronic Batching

Seen boosting accuracy and speed of batch weighing is a new punched-card system that eliminates the human element through electronic proportioning. Design accuracy is 0.1%.

System is termed especially valuable for processors requiring quick formula changeover, and to those who seek greater privacy in their formulation. If ingredient proportions are confidential, this arrangement gives management a means of issuing operating instructions in a code known only to itself.

Integrated with an automatic proportioning panel (Select-o-weigh, right photo), unit (PCR) employs handy punch cards which have been precoded for prescribed batching formulas. Operator merely inserts such a card into the reader, pulls a lever to lock it in place, and presses a start button. From that point, the system automatically provides exact cycling of any number of bulk materials through their various stages of weighing, mixing, and discharge.

Each punched card represents a complete formula, which can be repeated indefinitely by pressing a button. Or operations may be varied by successive insertions of new cards. A permanent record of programming can be obtained whenever separate cards are used for each operation.

Indicating lights register the various weights called for by the card in the order in which each ingredient is batched. When checked against dial-scale readings, these weights tell the operator how accurately the operation is going, but without disclosing batch ingredients.

Want More Information?

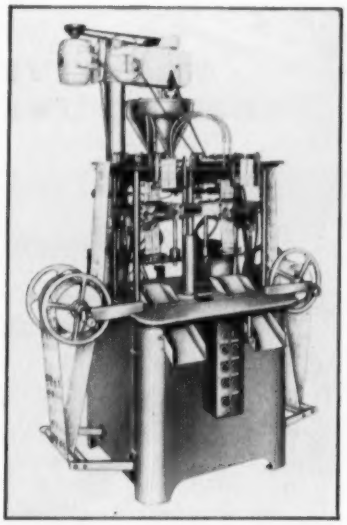
It's free — and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard — back of book. Then sign at the bottom and mail. For your convenience, too, these items are listed and keyed in the Reader Service Section.

First commercial installation of this equipment was at the Attala Co. feed mill in Kosciusko, Miss. Here, the system provides electronic control of 21 feeders, one hopper scale, a premix unit, and a mixer. There is a choice of four processing cycles: (1) Automatic punch-card operation, (2) full manual operation, (3) manual weighing and automatic mixing, or (4) automatic weighing and manual mixing control.

An inventory counter with totalizer records the amount of each ingredient used, also total amount delivered per hour, shift, or day. System also includes safety interlocks, such as under- and overweight signals, "off tare" controls, "dial override" signals, and special adjustment dials for each feeder.

Punch cards used in this mill are divided into 21 sections (one for each feeder), and quantities of ingredients are registered in decimals from 0-5,000 lb. in 10-lb. increments. —*Richardson Scale Co., Clifton, N. J.*

Circle 192A on Reader Service Card



Unit Forms, Fills, Seals Single-Service Packets

Designed for viscous, semi-viscous, and free-flowing liquids, this high-speed unit is termed ideal for single-service packeting.

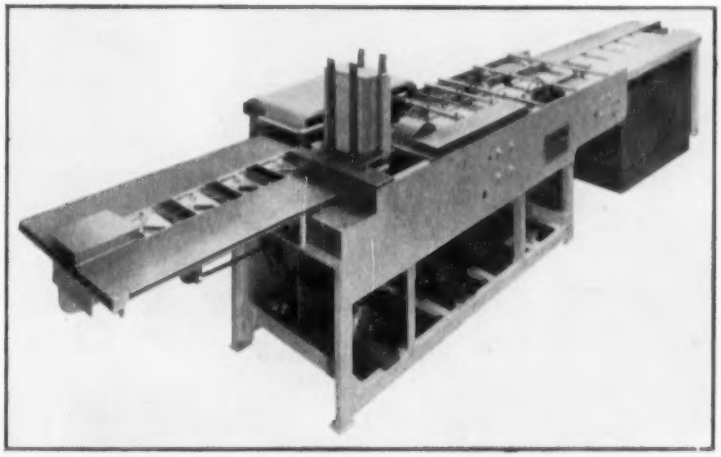
Called BFM Liquid Packeter, it employs stainless steel or Tygon tubing for all product-contact parts, and can be quickly disassembled for cleaning.

In one continuous operation, machine meters the product, then forms, fills, and heat-seals the packet. Its adjustable temperature range (to 500F.) permits use of a wide variety of heat-sealed materials. Reverse-vacuum action of feed pump or piston gives sharp product cutoff, which eliminates stringing or dripping.

Unit affords multiple filling and forming of envelopes up to 4½ x 4¾ in. at 8 per cycle, 25-50 cycles per min. Electric-eye registration of both sides of packet offers perfectly centered markings. And envelopes with notched or perforated dispensing spouts are easily produced.

Packeter takes 6x3 ft. of floor space and is 5 ft. 10 in. high. No catwalks or underfloor bracing are required for installation.—*Brown Filling Machine Co., Fitchburg, Mass.*

Circle 193A on Reader Service Card



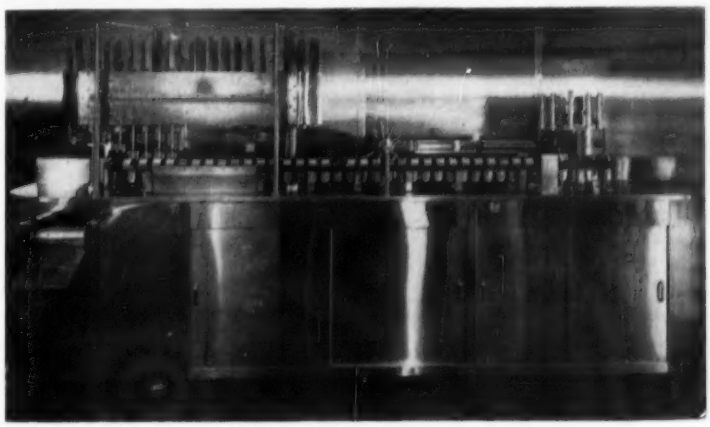
Frozen-Food Packager Eliminates Carton Overwrap

This automatic unit, designed for deep-freeze food packs, sets up and fills the carton, then hot-seals it to eliminate the need for overwrapping. This hot-melt seal, said to have fiber-tearing adhesion, is airtight at temperatures from −30 to 160F.

In operation, machine (Hot Melt Glu-Pac) employs removable glue applicators, a ¾-hp. cooling unit with recirculating coolant, and a 5-ft. compression conveyor with cooled steel belts. A special control prevents carton forming when no insert is ready, and insert failure stops the machine.

Changeover from fixed carton sizes ranging ¾x4¾x4¾ in. to 2¾x7½x9½ in. takes 20x30 min.—*Clybourn Machine Corp., 6479 N. Avondale Ave., Chicago.*

Circle 193B on Reader Service Card



High-Capacity Unit Freezes Stick Novelties With Air

Refrigerated air replaces the old brine tank in this compact, sanitary stick-novelty machine. Operated by one man, unit (Polarmatic) employs a special rotary filler for product uniformity. In high-speed automatic operation, it turns out wrapped or bagged goods, either single or twin.—*Glass-Marchak Machine Corp., P. O. Box 885, Austin, Tex.*

Circle 193C on Reader Service Card

CUT OUT AND FILE

Now...this new motor makes possible a self-washing milk cooler tank

Century
SELECTIVE
SPEED DRIVE

This girl is doing a complete wash and rinse job.

Choose ideal speed for:

- washing, rinsing, sterilizing
- stirring milk during cooling
- butterfat sampling

The secret of the new self-washing feature is the Century motor and speed control unit.

Turn the dial to high speed, and the impeller blades hurl a "spatter spray" of water against the inside of the tank for thorough washing, rinsing and sterilizing.

Turn the dial to slower speeds for stirring and sampling. You can select exactly the right speed for your requirements . . . depending on the variations of milk, temperature, butterfat content, etc.

Other advantages include: sealed pre-greased ball bearings . . . no oil contamination. No reducing gears . . . this versatile Century motor is direct drive.

A milk cooler with one of these Century motors enables you to maintain highest quality milk at a substantial saving in time and labor. Write for detailed information.

Performance-Rated ©
MOTORS
1/20 to 400 HP

CENTURY ELECTRIC COMPANY

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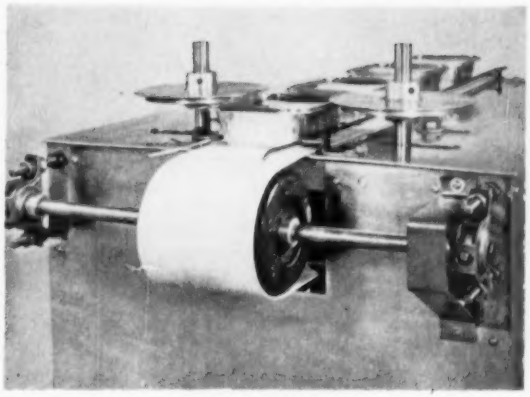
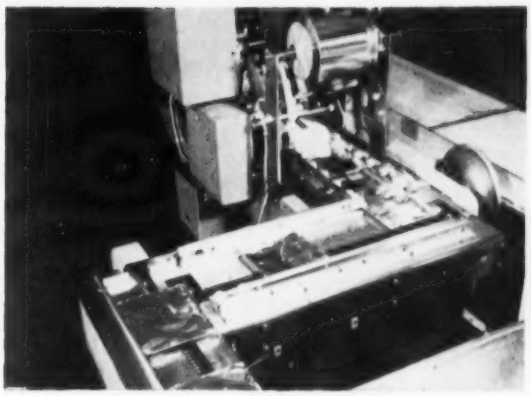


Rotary Closer



Foil Crimper

New Foil Pan Packagers Offer High Speed, Savings

Three new machines offer increased packaging speed and substantial labor savings for processors using rigid aluminum foil pans and containers.

Unveiled at the recent National Frozen Food Convention, the developments comprise two lid crimpers and an automatic tray dispenser.

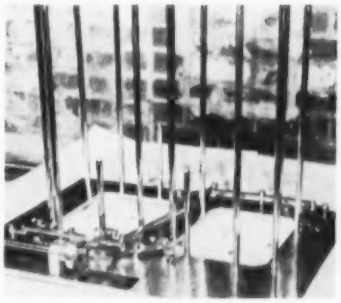
Probably of broadest interest is the Rotocrimp unit (left, above), designed to package entree and bakery goods in foil pans. Unlike standard closing presses, this latest machine applies stiff lids to containers by means of rotary "plows". It is quickly adjustable to all pan sizes, thus saves the cost of expensive closing dies. Speed of the unit is reported to exceed 100 pans per min.

The second development (right, above), applies flexible foil top sheets to either trays or pans at a speed of 60 containers per min.

Said to cut labor costs 85% under hand-crimp operations, unit is also reported to save up to 25% on packaging material. And the maker estimates that under average production conditions a processor can reap combined savings of $5,000 per 1,000,000 trays by using this unit.

Developed to work with the latter is an automatic tray depositor (right) that mechanizes the starting point of frozen dinner packaging lines. This unit takes nests of empty trays and deposits them singly on a feed conveyor. Rate of operation is adjustable to any line speed.

On the foil crimper, sheet stock is fed from a roll and trimmed to exact length. The foil is curled under the pan rim, then tightly crimped into place by a series of nylon rollers. This type of cover is particularly adaptable to packages where the food contents may protrude above the pan rim (as in TV dinners).



Tray Dispenser

Photo-eye registry is provided for printed foil.—*Kaiser Aluminum & Chemical Sales, Inc., 919 N. Michigan Ave., Chicago.*

Circle 195A on Reader Service Card

Produce Gently Handled In New Water Blancher

Flights and lifting paddles of this new water blancher are perforated to minimize product damage in continuous processing of fragile fruits and vegetables.

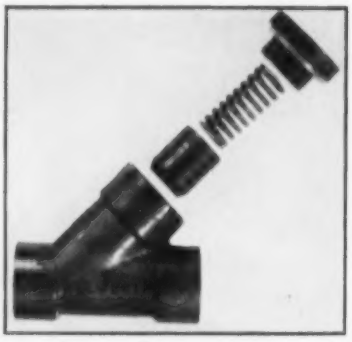
Typical items efficiently handled include ravioli, cooked potatoes, and beans.

In operation, unit (Model TL 24K2208) employs 24-in.-dia. flights to convey produce without pumping water in the same direction. Perforations permit free flow of water back through the flights for gentle handling, and precise clearance between trough and flights further minimizes risk of damage.

At the discharge end, out-curved paddles gently lift products onto a draining screen in discharge chute. Design of these paddles curbs return of product to the rotating flight, and perforations prevent water being discharged with the product.

Compact unit permits accurate control of blanching time and temperature. Of simple construction, it is easily accessible for thorough cleaning. Fractional-hp. motors give desired speeds for blanching times ranging ½-10 min.—*Rietz Mfg. Co., Santa Rosa, Calif.*

Circle 195B on Reader Service Card



Unique Lift-Check Valve Has All-Plastic Design

This pioneering all-plastic lift-check valve is made of rigid polyvinyl chloride for high corrosion resistance to alkalis, acids, and inorganic salt solutions. A highly durable PVC spring positions the disk for quick and complete shutoff.

Lightweight unit operates successfully at pressures to 150 psi. at 75F. Easily handled and installed, it is available for pipes from ¼-2 in., and comes in either threaded, solvent-weld socket-type, or flanged ends.—*Walworth Co., 60 E. 42nd St., New York City.*

Circle 196A on Reader Service Card

Ultrasonic Thickness Gage Spots Metal Corrosion

With this battery-powered ultrasonic thickness gage, operator (in photo) quickly checks the steel-walled dust collector for corrosion or wear.

Similarly, unit (Sonizon SO-200) may be used for maintenance testing of storage tanks, pipes, rolls, and other structures accessible from one side only. Lack of bond between materials can also be detected.

Portable instrument gives direct thickness readings. Operator merely selects proper crystal range, probes the test area, and rotates a circular read-out dial until harmonic lines match a pattern of flashing lights.

Unit does not require warmup and is accurate to 3% on thicknesses from 0.027-4 in. It can be used with nearly all rigid materials, including most metals, glass, and hard insulators. Instrument (9x8x9 in.) weighs 8¼ lb.; battery case, 11½ lb.—*Magnaflux Corp., 7300 W. Lawrence Ave., Chicago.*

Circle 196B on Reader Service Card

Compact Unit Provides Central Motor Control

This structure houses controls for groups of a.c. motors, 3-phase systems operating at 220v. (1-100 hp.) and 600v. (1-200 hp.).

All controls are centralized in one group of stationary, interchangeable enclosures (Class 11-350), each with a grouping of modular starting units. Individual structures (90⅜ in. high and 20 in. wide) may be combined with straight-line, L-shaped, or U-shaped assemblies. They are available for both front and back-to-back mounting of controls, in NEMA 1 indoor or NEMA 3 outdoor weather-resistant enclosures.

Each structure contains a main horizontal 3-phase bus lowered 12 in. from the top, and a 3-phase vertical bus for distribution of power to starter unit.

Modular starter units have uniform width and depth, while heights vary from 9½-70 in. in multiples of the two basic sizes, 14 in. and 9½ in. All sizes are removable and may be intermixed in the same structure. Starters are of the combination-magnetic type consisting of a circuit-protective device and a starter.—*Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh.*

Circle 196C on Reader Service Card

Prints 4-Color Designs On the Packaging Line

This unit now enables the packager to use low-cost unprinted stock and apply his own custom designs to wrappers in an integral packaging operation. Or he can use partially preprinted stock and insert the variable imprint.

Machine (Imagraph) applies multi-colored designs on cellophane, plastic film, or paper packages. It can be attached to any standard wrapping, bundling, or bag-making device, and does not require use of ink or printing plates.

Designs may be of any shape, any size up to 4x3 in., and may include up to four different colors. All colors are printed simultaneously in a simple direct-transfer action, prints being placed either on the face or underside of a material. Unit is specifically designed to apply Dennison Mfg. Co.'s transfers (Therimage).

Equipment is fully automatic, synchronizing with parent machine's operation to produce up to 100 im-

New book tells full story of stainless pipe and tubing

If you use stainless or high alloy pipe or tubing, this new illustrated handbook was written for you. It's 48 pages big – packed with informative data that you'll refer to again and again.

The table of contents is too long to list here, but it includes, for example, analysis and conversion tables, corrosion characteristics, weights, alloy properties, bending, joining and installation hints.

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A Subsidiary of Crucible Steel Company of America
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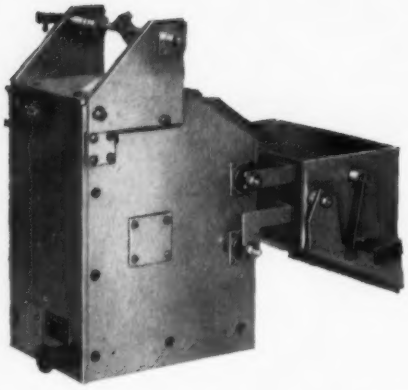
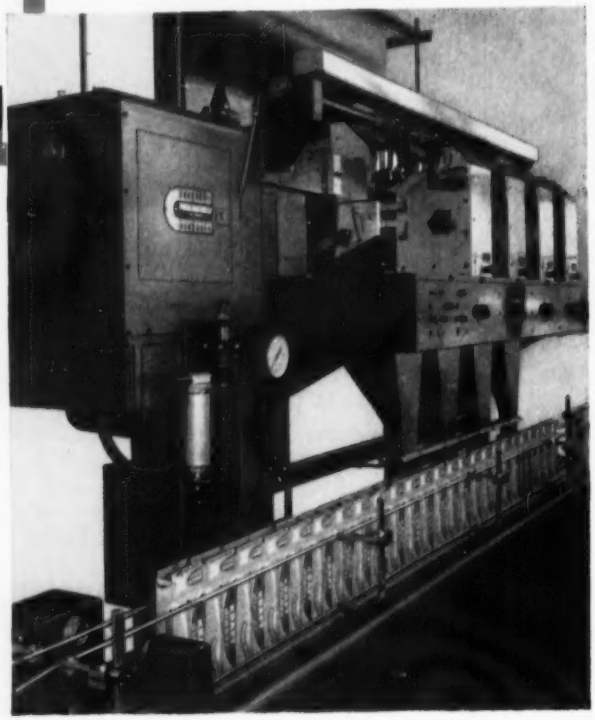
for you, too—



IN THIS MAGIC BOX



PRODUCT net weight, we mean—a highly important factor to America's volume producers of packaged goods . . . because it can, and does, have a direct bearing on net profits.

PNEUMATRON provides net weighing accuracy never before available . . . using a new instantaneous pressure principle. The Pneumatron "head" contains a highly responsive cantilever assembly which moves only a few thousandths of an inch during the weighing operation—eliminating wear and friction. An extremely sensitive control device—an air jet—instantly detects and measures the position of the weighing assembly—keeps package contents within tolerances which are remarkably close.

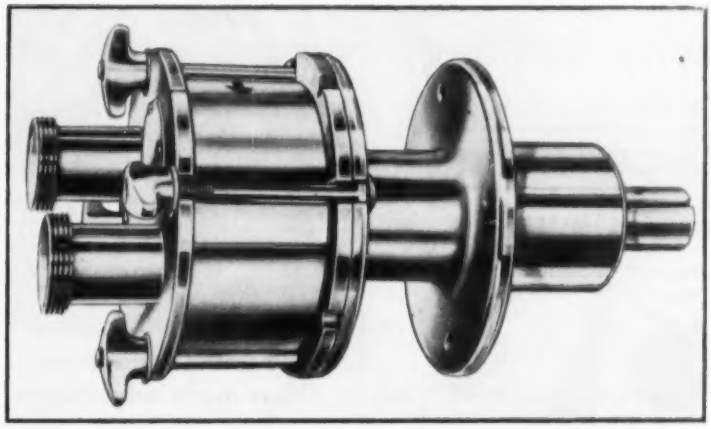
That's PNEUMATRON, in brief. Now setting new standards of dependability and economy in the packaging of the products pictured above, it is the culmination of Pneumatic's years of specialization in the engineering and building of automatic packaging equipment. Such advanced design is characteristic of all Pneumatic equipment for bottling or packaging.

PNEUMATIC SCALE CORP., LTD., 91 Newport Avenue, Quincy 71, Massachusetts. *Also: New York; Chicago; Dallas; San Francisco; Los Angeles; Seattle; Leeds, England. Canadian Division: Delamere & Williams Company, Ltd., Toronto.*

★PNEUMATIC *Packaging and Bottling Equipment*

pressions per min. In addition, it is adjustable for accurate positioning of a design anywhere on the wrap. Improved label appearance, positive adhesion, less bulk, and faster application are cited as other advantages of this unit.—*Adolph Gottscho, Inc., Hillside, N. J.*

Circle 196D on Reader Service Card



Sanitary, Bracket-Mounted Tank Pump Curbs Foaming

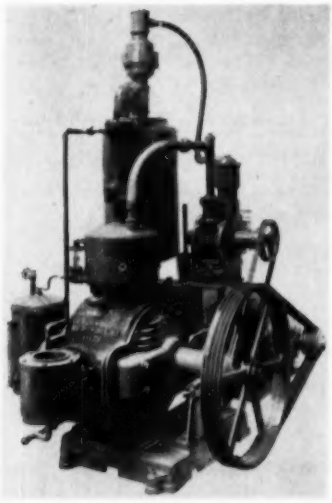
Easy cleaning and foamless pumping action are advantag cited for a new line of bracket-mounted units. Designed for use on bulk-pickup milk tank trucks, they require no lubrication.

Units (Sanitors) are available in capacities of 20, 35, 50, and 90 gpm. Pump and bracket are of dairy-type metal, shaft and bolts are stainless steel. Precision construction permits interchangeability of parts in the field.

The flanged bracket permits easy mounting on the tank bulkhead. Pump can be removed by loosening four handwheels, then completely disassembled (without tools) for cleaning. There are no hard-to-clean threads or splines in the milk zone.

Unit employs three O-rings, one for sealing the shaft, the other two installed in open grooves on the casing. This arrangement simplifies removal of rings, also eliminates hard-to-clean grooves. — *Viking Pump Co., Cedar Falls, Iowa.*

Circle 199B on Reader Service Card



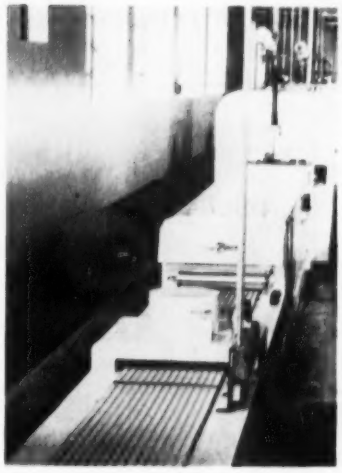
2-Stage Vac Pump Excels In Low-Micron Service

Fast pump-down and recovery, plus high efficiency in low-micron operations are advantages cited for a new line of two-stage vacuum pumps. For both dry and wet systems, their capacities range 28-880 cfm.

Illustrated pump (Combination Two-Stage) is an integral unit (300 cfm.) requiring only a small lubricating-oil charge. Powered by a single motor, it employs a fore or backer stage and a high-vacuum stage. Latter has its own lubrication supply which is always under vacuum, thus remains uncontaminated and completely degassified at all times. This stage exhausts at a pressure low enough to prevent vapor condensation. Pump-down from atmospheric pressure is automatic.

Systems with considerable amounts of condensable vapors are also handled efficiently and economically with these pumps.—*Beach-Russ Co., 50 Church St., New York City.*

Circle 199C on Reader Service Card



Oven Ups Biscuit Quality, Reduces Baking Time

This cost-cutting oven reportedly produces higher-quality biscuits in shorter baking time.

Of Belgian design, unit (Ooms Rocket) operates either on gaseous or liquid fuels, and can be changed over without altering the oven. Automatic controls provide easy starting and baking stability. Each oven section has a control board that permits 1-deg.-F. regulation, and 2-deg.-F. modulation of top and bottom heat from 0-100%.

Powerful radiators in the unit reduce the difference between radiating and baking temperatures, also enable higher combustion efficiency. And turbo-convectors provide the faster, more accurate baking at lower temperature.

Oven's sanitary steel construction allows free expansion, which cuts wear and stress. There is a central chimney with forced exhaust, and all outside panels are finished in an easily-cleaned synthetic enamel.

Quick and easy installation minimizes production delay.—*J. W. Greer Co., Wilmington, Mass.*

Circle 199C on ReaderService Card

Insure Uniform Quality Cooking

DOUBLE-CHECK with COOK-CHEX

The Easy-To-Use Cooking Indicator Tag

When a Cook-Chex is attached to a retort basket . . . *Anyone* in your plant can double check, at a glance, *two important* facts!

1. **The basket has, or has not, been through the cooking process.**
2. **It has, or has not, been subjected to *proper* cooking conditions.**

These two facts are important to you because they eliminate the usual problems of: a wrong cook schedule, keeping baskets in sequence, and the possibility of "losing" uncooked baskets!

Easy-to-use Cook-Chex signal these essential facts automatically! Cook-Chex, produced with a *purple* chemical ink, turn color to *green* only after your proper cooking conditions have been achieved. Cook-Chex react to precise conditions of temperature, steam and time; and, may be ordered to meet your specific cooking requirements.

Cook-Chex are also excellent as a low cost, permanent record for your cooking-room operations.

Double-check with Cook-Chex to insure uniform quality in your food products. Send for supply of Cook-Chex samples.

ATI COOK-CHEX

Another product by ASEPTIC-THERMO INDICATOR COMPANY

Aseptic-Thermo Indicator Company
11471 Vanowen St., North Hollywood, Calif. FE-10

Please send a FREE supply of Cook-Chex for use with a cooking process of _____ degrees F., for _____ minutes.

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

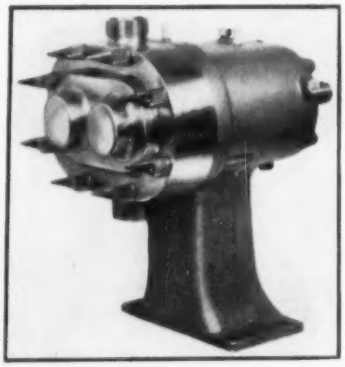
New Dock-Leveler System Offers Many Advantages

Developed for economical installation on concrete docks, these dock boards automatically adjust to truck or trailer floor levels.

Having minimum set-back, units (Perma-Docks) allow more usable dock space, also swing up and out of the way when not in use. Of light weight magnesium for easy handling, they can be quickly raised or lowered. Also provided are safety curbs for guarding power-truck tires, crowned designed to prevent hangup of low-underclearance equipment, flared curb ends for safe wide-angle turns, and beveled edges to avoid load jar.

An electric-hydraulic system is optionally available for fully automatic operation.—*Magline Inc., Pinconning, Mich.*

Circle 200A on Reader Service Card



Pump's Special Design Guards Viscous Items

Construction of this sanitary pump aims at maximum protection for viscous products.

Called Side-Mounted, its special base enables mounting the pump so that intake and outlet are in a vertical plane. As a result, the intake can be attached directly to bottom outlet of tanks, vats, kettles, or hoppers, thus eliminating all piping elbows which might restrict product flow.

This feed arrangement boosts the viscous-product pumping range. Furthermore, products containing whole or large discrete particles, such as potato salad or cottage cheese, can be pumped without damage.

Units are available in ratings from 60-100 gpm., in V-belt or variable-capacity models. The pump itself is maker's latest standard positive-displacement unit.—*Waukesha Foundry Co., Waukesha, Wis.*

Circle 200B on Reader Service Card

Rugged Cold-Storage Door Takes Wider Pallet Loads

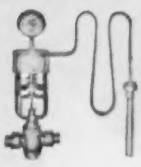
All rubber and tear-resistant, this new cold-storage batten door is specially designed to take wider pallet loads safely. And it is particularly recommended where width of doorway is limited, requiring only a 6½-ft. opening for a 4-ft. pallet.

Units (Flexidors) are built to withstand constant battering by fast-moving trucks, also off-center impact and corner cutting. Self-closing, they curb costly refrigeration loss during loading and unloading, and can be mounted on frames used for rigid doors.

Made of ¼-in. thick Neoprene without grain, they are impervious to grease and oil, do not mark meat

HOW TO PICK THE BEST REGULATOR FOR TEMPERATURE · PRESSURE · LEVEL

It pays to use Fulton Sylphon Regulators as your starting point in selecting controls. With the broadest line of self-operated regulators, Fulton Sylphon has the *one best* solution for any regulator application. You get the accuracy and performance the application requires without spending a cent extra for features you don't need.

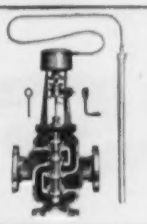


REGULATORS WITH THERMOMETER

Regulator controls temperature . . . thermometer shows it. Dial serves as check on regulator operation. Also permits swift, accurate changes of control setting. Adjustable ranges from 20° to 480° F. Various bulb styles and materials.

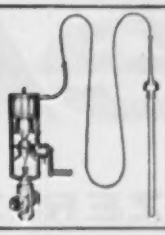
STANDARD TEMPERATURE REGULATORS

Control liquid, air or gas temperature by throttling heating or cooling supply. Extra-large Sylphon® bellows assures positive valve positioning with high flow pressures. Over-run protection. Adjustable ranges from 20° to 480° F.



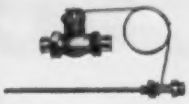
MANUAL OVER-RIDE REGULATORS

Self-powered regulator automatically controls liquid, air or gas temperature. Crank permits manual valve positioning at any time. Provides quick shut-off or full-open operation. Adjustable ranges from 40° to 330° F.



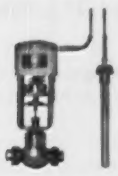
QUICK-ADJUSTMENT REGULATORS

Turn of a crank quickly adjusts regulator to any control setting within range. Ideal where control point is changed frequently. For liquids, air or gases. Ranges between 40° and 480° F.



STEAM HEATING REGULATORS

Packless, dial adjusted types control liquid, air or gas temperature by throttling steam 75 psi or below. Calibrated dial on bulb types speeds control settings. Adjustable ranges from 35° to 110° F. Liquid and air type bulbs.



SAFETY TEMPERATURE REGULATORS

Regulator maintains liquid, air or gas temperature and can also turn valve full-closed or open as specified if bulb or tubing is damaged. Protects equipment and production. Adjustable ranges from 50° to 245° F.

PRESSURE REGULATORS and CONTROL VALVES

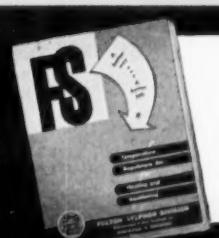
Act as pressure reducers, pump governors, relief valves, for constant pressures from 60 to 2 lbs. Vacuum regulators also available.

FULTROL PILOT CONTROLLERS

Low-cost pilot modulates air or hydraulic pressure to valves, dampers, other devices. No troublesome pivots or levers. Adjustable 25° F. proportional band. Dial settings. Ranges up to 600° F.

LIQUID LEVEL CONTROL

Simple, direct-acting float valve controls level of liquids or slurries in open reservoirs. Corrosion-resistant and sturdy. Single-seated or double-seated valves in sizes from ¼" through 4".



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FORMERLY CALLED STABILIZER 37

A name has changed. From Stabilizer 37 to Instant Clearjel. Why?
Because this dramatic new cold swelling starch offers all the wonderful features that made regular Clearjel famous for fruit pie fillings. Full color. Full clarity. Full flavor. *PLUS* the great new feature—Instant Thickening!

INSTANT CLEARJEL reduces preparation time to a matter of minutes. No cooking. No prolonged stirring. No cooling. You simply add water or juice to dry ingredients. Agitate. Then mix in fruit. Now your filling is ready to freeze or bake. All a worthwhile savings in time, labor, fuel.

FREE SAMPLE. See for yourself how Instant Clearjel creates an easier to make fruit pie filling. Write today for a sample and suggested formulas.

NOW AVAILABLE FROM YOUR BAKERY SUPPLY HOUSE

National
STARCH PRODUCTS INC.

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carcasses or cartons, and remain flexible at temperatures down to −40. Metal jam guards protect the frames, and shatterproof windows are held firmly by impact-resistant polystyrene retaining rings.—*Jamison Cold Storage Door Co., Hagerstown, Md.*

Circle 200C on Reader Service Card

INGREDIENTS

New Flavoring Ups Appeal Of Chocolate Coatings

Flavor of synthetic chocolate coatings reportedly is improved by a new chocolate-vanilla powder. These coatings are used in hot weather to prevent discoloration, but generally are low in flavor value.

Addition of 1% of flavoring (Cocoa-Van) is said to couple superior taste-appeal with hot-weather stability.—*Dodge & Olcott, Inc., 180 Varick St., New York City.*

Circle 203A on Reader Service Card

New Mace Oleoresin Offers Authentic Nutmeg Flavor

Of interest to bakers and other users of nutmeg flavor is a new spice oleoresin said to be completely solvent-free.

Designated "Oleoresin Mace," it is a reddish-brown liquid containing 50-60 cc. of volatile oil per 100g., which carries the full flavor of the natural spice. Lasting quality is a particular advantage when product is used in baked goods.—*Fritzsche Brothers, Inc., 76 Ninth Ave., New York City.*

Circle 203B on Reader Service Card

Adds Sodium Cyclamate To Sweetener Line

Now supplementing maker's calcium cyclamate is a sodium-base, non-nutritive sweetener intended primarily for use in formulations containing ingredients which would not be compatible with calcium.

Called "Cylan" sodium cyclamate, it can be used with products containing phosphates, tartrates, and oxalates (where calcium would form insoluble salts). Applications include syrups, beverages and concentrates, canned and frozen fruits, juices, preserves, dessert powders, salad dressings, pickles, and ketchup.

Material is a white solid, practically odorless, readily water soluble, and with sweetness about 30 times that of sugar. It is stable from pH 2-10 and at temperatures to 500F. Product retains its sweetness indefinitely and shelf-life is not affected.—*E. I. du Pont de Nemours & Co., Product Information Service, Wilmington, Del.*

Circle 203C on Reader Service Card

CHEMICALS

Spray-Painting Simplified By Quick-Drying Alkyd

Time and labor spent in masking areas to be spray-painted, and in subsequently removing the overspray, may be cut with use of a new quick-drying interior paint.

Overspray particles of this flat, white alkyd coating (Spray Mill White) reportedly dry before reaching the floor, thus can easily be swept up. Product is termed extremely durable on surfaces such as wood, metal, wallboard, plaster, and concrete. One coat covers most old painted walls and ceilings, and newly primed surfaces.—*Tropical Paint Co., 1210 W. 70th St., Cleveland.*

Circle 203D on Reader Service Card

Ceramic-Like Wall Surface Cuts Sanitation Costs

Seen drastically reducing the cost of wall and ceiling sanitation is a new ceramic-like surfacing that resists chemicals, grease, steam, and condensate.

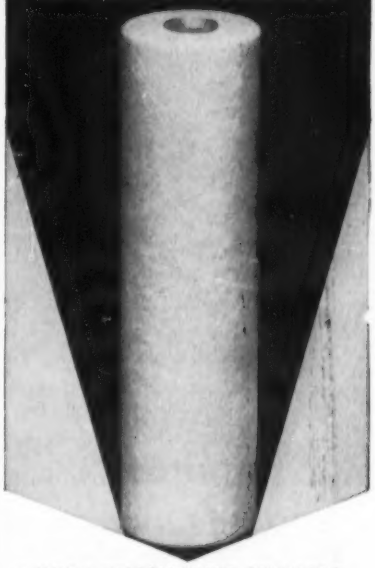
Product (Sanitile) is especially recommended for processing areas in bakeries, breweries, dairies, meat and poultry plants, and canneries. Applied over wood, plaster, wallboard, cement, or concrete block, it forms an integral high-gloss surface. Latter also curbs growth of mold, bacteria, and fungi.—*Master Mechanics Co., 2097 Columbus Rd., Cleveland.*

Circle 203E on Reader Service Card

A NEW FILTER CARTRIDGE for the FOOD INDUSTRY

CUNO

MICRO-KLEAN



- **NEW 5-MICRON WHITE CELLULOSE CARTRIDGE . . .** is ideal for water, liquid food processing and all other applications where *Fine Filtration, Purity, Clarity* and complete absence from any filter-imparted *Taste* are essential.
- **LOWEST CARTRIDGE REPLACEMENT COST . . .** because Cuno's exclusive "Graded Density" feature uses the entire cartridge body for micronic filtration. Cartridge life is *doubled!*
- **A COMPLETE LINE OF STANDARD HOUSINGS . . .** for this new filter cartridge provides flow rates from a few gallons per hour to *hundreds* of gallons per minute!

WRITE NOW FOR COMPLETE INFORMATION

Send for your free copy of Cuno Micro-Klean Catalog No. 53-100.

FOR APPLICATION ENGINEERING SERVICE . . . contact the Cuno Field Engineer conveniently located in your area. This specialist is fully qualified to provide the help you need to solve your filtration problems.

CUNO ENGINEERING CORPORATION

24010 South Vine Street, Meriden, Connecticut

Filtration Engineers in Principal Cities

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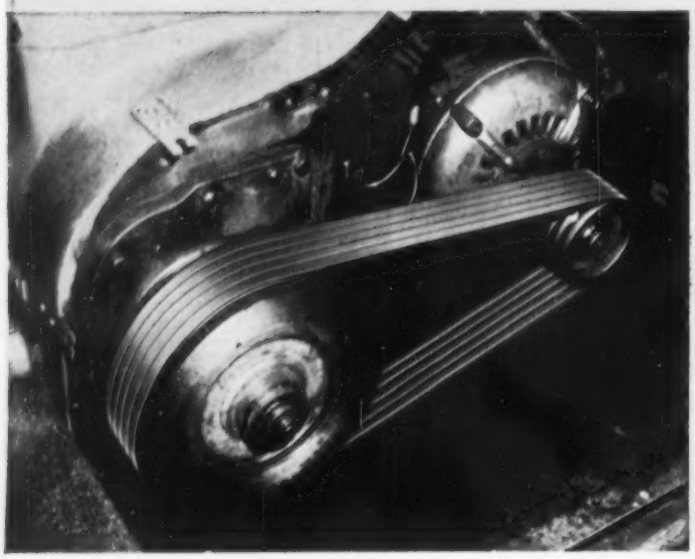
CONCAVE SIDES make V-belts last longer



***See for yourself* why the concave sides (Fig. 1) of a Gates V-Belt greatly lengthen its life. Just do this:**

Bend a Gates belt and feel the sides. Note how these precisely engineered concave sides *fill out* on the bend and *become straight*. Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.

Fig. 1

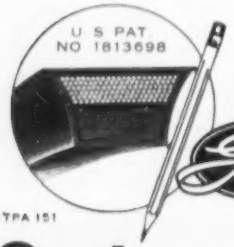
Fig. 1-A

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

Fig. 2

Fig. 2-A

For longer belt life...lower belt costs, specify the V-belt with Concave sides—Gates Vulco Rope...readily available from nearby distributor stocks.



TPA 151

World's Largest Maker of V-Belts

The Gates Rubber Company

DENVER, COLORADO

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and in 70 other countries throughout the world.

Gates VULCO ROPE Drives

BRIEFS . . .

Beamless Bench Scale, which concentrates readings in upper part of dial housing, permits weighing of tall objects that might obscure the lower portion of a standard dial. Scale capacity is 250 lb. with ¼-lb. graduations, and distance from platform to dial-reading area is about 29 in.—*Toledo Scale Co., Toledo, Ohio.* (204A)

Self-Contained Steam Cleaner for light duty operates at any water pressure without auxiliary pump. It delivers 60 gph. of solution balanced with respect to soap concentration, temperature, and pressure. Compact unit (Handyman 60) also offers 65% thermal efficiency to cut fuel costs.—*Clayton Mfg. Co., P. O. Box 550, El Monte, Calif.* (204B)

High-Speed Depositor, employing precision suction chamber for liquid batters, is quickly converted to wire-cut machine. Sanitary unit (Universal) deposits wide variety of biscuits and cakes, and can be equipped with special nozzles for decorative effects. Hourly output (with 26x26 in. tray): 1-oz. cup cakes, 20,000; deposited biscuits, 50,000; and wire-cut biscuits, 60,000. Machine also handles trays 10, 16, and 18 in. wide.—*K. G. Z. Bakkerij-Machinefabriek, 193 N. Gracht, Utrecht, Holland.* (204C)

Formula-Control System, operated by punch cards, speeds continuous blending of liquids and solids. Only a card reader and feeder or pump drive (with control actuators) are needed for most applications. Formula card, pre-punched for up to 35 components per run, controls feed rates to 0.1% accuracy.—*Graham Transmissions Inc., Menomonee Falls, Wis.* (204D)

Sanitary Icing Machine automatically applies free-flowing and/or buttercream icings (stripes and sheets) to all types of baked goods. Stainless unit (Frost-O-Fast) has 130-lb.-capacity tank with two 750w. immersion heaters thermostatically controlled.—*Basic Foods Sales Corp., Englewood, N. J.* (204E)

Electronic Moitsure Tester employs high-frequency current for 1-min. determination in 0-26% range. Sample (such as copra) is shredded, then hydraulically compressed in the unit to eliminate air pockets. Portable instrument is battery-operated. —*Moisture Register Co., P. O. Box 910 Alhambra, Calif.* (204 F)

This man defies gravity

(He maintains propylene glycol specifications through quality control)

At every stage of processing propylene glycol, U.S.P., a sample is drawn. Is ash content low enough? Does distillation fall within range requirements?

What about sulfate turbidity?—Our chemist checks.

Diluting 5cc. of propylene glycol with 15cc. of distilled water, he adds 5 drops of hydrochloric acid and 5 drops of barium chloride. The complete clarity that results tells him, "OK". So must other tests.

If specific gravity, for example, proved too high or too low, corrective measures would be taken immediately to change it. And we do mean *change it*. For the specifications of Dow propylene glycol meet or exceed those set by the U.S.P.

Quality control is one more area where you'll find Dow increasing the value of your chemical dollar. You'll find extra efforts and services, planning and modernized techniques helping you to shape the future, today. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. GD 809G-2.

YOU CAN DEPEND ON DOW

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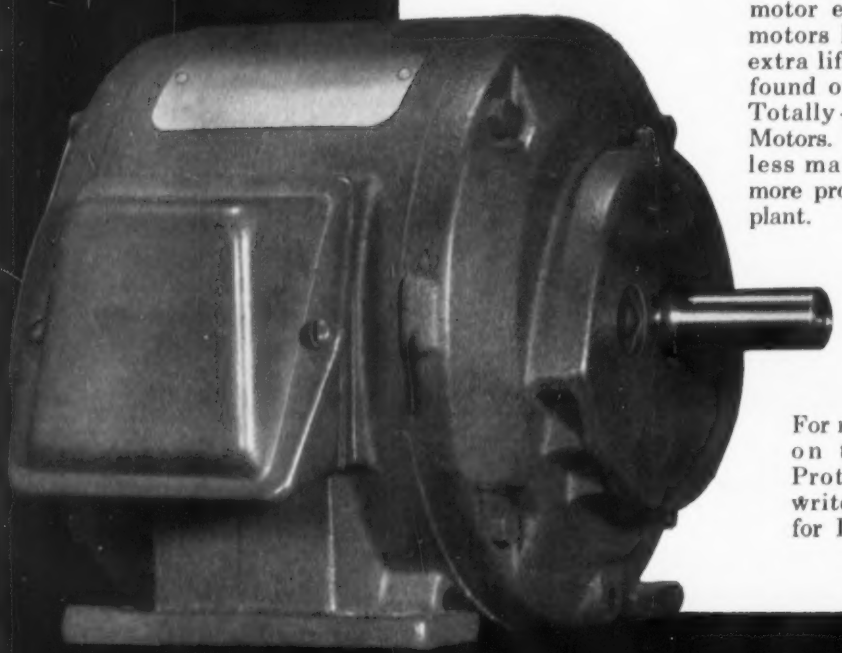
When we speak of Totally-Protected, we mean superior frame design with rigidity for heavy load conditions. We mean Metermatic bearing lubrication, acid and oil-proof insulation system, and motor leads, labeled and sealed in neoprene.

Totally-Protected means all this and more, but most of all it means a new concept of motor design and construction.

This Totally-Protected concept brings you a new motor efficiency. These motors have a built-in extra life—an extra life found only in Reliance Totally-Protected A-c. Motors. You profit from less maintenance and more production in your plant.



For more information on this Totally-Protected concept, write to Dept. 3710A for Bulletin B-2401.

(B-1043)

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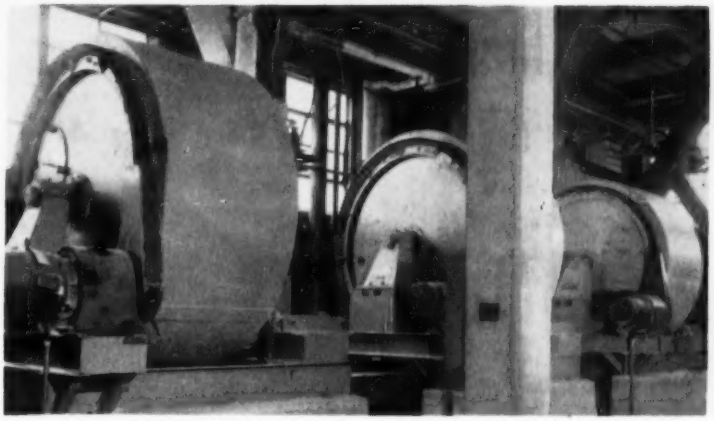
EQUIPMENT APPLICATIONS



Blenders' 4-Way Mixing Assures Product Uniformity

Efficient 4-way mixing action of these 2,000-lb.-capacity dry blenders guards product uniformity at Hershey Chocolate Co., Hershey, Pa.

Furthermore, downtime for cleaning and maintenance has been minimized by the "open-door" design of the carbon-steel units (Sturtevant Mill Co., 106 Clayton St., Boston).

In operation, blenders are fed by screw conveyor. As units rotate (first mixing action), revolving buckets raise entering material for cascade-type mixing. In addition, product continually moves from ends of drum toward the middle (third mixing action), and swinging chutes provide important lateral blending.

Both loading and unloading of blenders are controlled from remote panels, and mixing is automatically timed. Batches are then discharged by screw conveyor.

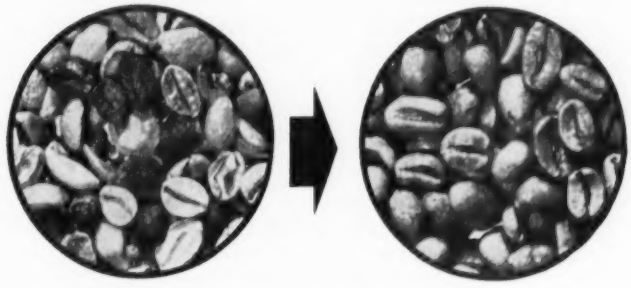
Circle 207A on Reader Service Card

Sorting Belt's Green Color Reduces Eye Strain

A special green conveyor belt, made of oil-resistant synthetic rubber, has greatly simplified inspection of some 12 tons of product per day at Blakely Peanut Co., Blakely, Ga.

Eye strain in the sorting operation has been sharply cut by the attractive color of the belting (United States Rubber Co., 1230 6th Ave., New York City). Furthermore, the belt is not discolored by oil from the peanuts, and its slick surface is easy on finger nails when rejects are popped off the line.

Circle 207B on Reader Service Card



Unretouched photographs of a typical coffee bean upgrading with standard Sutton equipment.

Picture of a man making money . . . . .

The upgrading and classifying of coffee beans is only one of hundreds of different Sutton equipment applications. However, all have one factor in common. *More profit for the processor.*

Specifically, here's what *dry separation by fluidization* can do. With an extremely accurate removal of contaminations *(both magnetic and non-magnetic)* you automatically control quality through increased purity, decrease wear and tear on equipment, and minimize hand-picking costs.

There's a lot more to tell about Sutton Gravity Separators and Stoners. May we?

FOR ADDITIONAL INFORMATION ON VARIOUS MODELS AND OPERATING DATA, WRITE DEPT. FE, SUTTON, STEELE & STEELE, INC., 1031 SOUTH HASKELL, DALLAS, TEXAS

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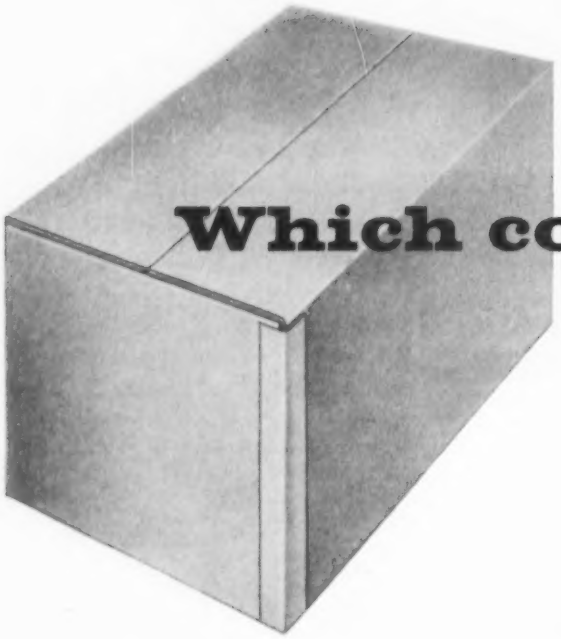
SEPARATIONS

What you should know about
"manufacturer's joints" in Union Boxes.



Which corner of a box

One corner is more important than the rest: where your corrugated shipping container is held together. This "hinge", or manufacturer's joint, often holds the key to your box's performance.

As the illustrations show, manufacturer's joints comprise three basic types: taped, stitched, and glued-lap. Each does a special job. Knowing which to use, and when, calls for a detailed analysis of your product and how it will be shipped.

Union Box engineers will be glad to make such a study for you. This is part of Union's complete structural design service. These fundamentals, however, are excellent guides:

Many shippers prefer tape

Taped Joint
(outside)

Tape is generally gum-backed, reinforced kraft paper or cloth, having high tear strength, especially in the lengthwise direction. Tapes are 2, 2½ and 3 inches wide and come in varying grades depending on degree of strength required.

← For more data, circle this page number on card at back

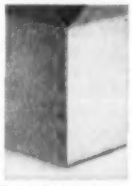
should you examine first?

Advantages: no projections. In stacking, boxes lie flat, rock less. Also, entire interior area of box can be used. The taped joint is continuous, too . . . seals out dust and dirt. And it folds to make a true box corner.

On the other hand, tape is frequently more expensive than other manufacturer's joints. It can be adversely affected by moisture also. In some cases, tape may interfere with printing.

The sturdy stitch

Frequently used for heavy items like canned goods, this joint uses steel staples driven from the outside of the box panel. It is probably the strongest "hinge", gives the most positive closure, and is not affected by moisture or cold. It is usually the least expensive.



Stitched Joint (outside)

The closure, however, is not continuous. And, since the metal stitches may protrude inside the box, this joint is normally not recommended for fragile and prone-to-scratch articles.

The diagonal stitched joint shown is a typical arrangement. Others include vertical, horizontal, and double stitching.

Glued lap . . . the versatile joint

Flap may be adhered either to the inside or outside of the box, and to the end or side panel. Inside-flap gluing is the most popular. It is the only joint which leaves a completely uninterrupted exterior printing surface.

Like the taped joint, the glued lap joint is continuous . . . forms a true fold. Performance under adverse moisture conditions is questionable. Also, inside-lap does not give 100% clear inside-packing area.

Glued Lap Joint (inside)

Take full advantage of Union's accumulated knowledge in constructing and recommending manufacturer's joints for shippers in every industry. Consistently well-engineered features such as these offer the surest protection for your product and your shipping investment.

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Write for Union's free, informative booklet "Manufacturing Corrugated Boxes."

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Ac'cent Flavor-Gram

CAPSULED NEWS FROM THE WORLD OF FLAVOR

✓ NOW, EVEN THE PILL-MAKERS ARE RECOGNIZING THE IMPORTANCE OF FLAVOR! Covering a bad tasting medicine with a pleasant flavor has now become an exacting science with pharmaceutical makers, reports "What's New in Food and Drug Research."

Today, pharmaceuticals are being grouped with flavoring agents that are compatible and familiar so as to not shock the palate. Bitter compounds, such as barbiturates and tranquilizers are enjoying a pleasing flavor; the sours are being shifted toward the acceptable taste of citrus, and so on.

Today's pharmaceutical makers are more and more flavor-conscious because they have discovered that tasty medicinals are good business.

✓ WHAT'S NEW IN THE '57 EDITION OF THE FROZEN FOODS INDUSTRY'S "BIBLE"? To cover all the revolutionary strides in the frozen food industry, the third edition of "The Freezing Preservation of Foods" has been published in two volumes by Avi Publishing Company, Westport, Connecticut.

In Volume I, you'll find entirely new chapters on: Dehydrofreezing of Fruits and Vegetables . . . The Freezing Concentration of Juices--Freeze Drying . . . Vacuum Concentration--Freezing Concentrated Juices . . . The Preparation and Freezing of Game . . . The Warehousing of Frozen Foods . . . as well as a new chapter on the marketing aspects of frozen foods.

Volume II is the first comprehensive book that deals with the production, marketing, and use of frozen precooked and prepared foods, desserts, baked goods and confections.

Authored by Donald K. Tressler, Scientific Director, Quartermaster Food and Container Institute and Ac'cent's New Products Technical Director, Clifford F. Evers, this is the authoritative and all-inclusive "bible" for everyone in the frozen food industry.

✓ HOW DO YOU BECOME A LEADER IN THE SOUP BASE FIELD? Use only the best of ingredients . . . make the most of their flavors . . . and have an absolutely accurate quality control. This is the successful formula of the Mary Lynn Division of Choldun Manufacturing Co. of New York, specialists in soup bases and mixes.

They use only natural products--no synthetics and no artificial flavors. They import such raw materials as barley and onions from Holland, beef extract from Argentina, spices from the Philippines, and herbs from six countries.

In the blending of these fine ingredients, they enhance their excellent flavors with Ac'cent brand of monosodium glutamate. Flavor retention is of extreme importance, as a chef may add nothing except water to the soup base.

✓ THE FRESHER THE VEGETABLES, THE GREATER THE GLUTAMATE CONTENT. The glutamate content of many vegetables fades progressively during storage, shipping and processing. Ac'cent restores the natural glutamate content to its original level and even intensifies the natural flavor (from article in Food Technology by Hac, Long and Blish.) Ac'cent, pure monosodium glutamate, is the ingredient that enhances and retains flavors in most meats, poultry, fish and soups as well as vegetables, without adding a flavor of its own. Because of its important flavor enhancement and retention properties, monosodium glutamate is used today in more than 8,000 processed and prepared food items.

And because Ac'cent is stable, it holds these natural flavors through freezing, canning, storing. Ac'cent literally "keeps foods young".

✓ FLAVOR IS THE MAIN BUSINESS OF AC'CENT · INTERNATIONAL. These monthly reports on new developments and happenings in the Food Processing Industry are just one of the many services we offer you.

As the American pioneer of monosodium glutamate and flavor development, let our experience, our research and technical facilities and qualified personnel help you solve your flavor problems.

If you would like to know more about the news items reported here, just drop a line on your letterhead to Technical Service Dept., Ac'cent · International, 20 N. Wacker Drive, Chicago 6, Ill.

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Pipe and Tubing

Fact-packed catalog has well organized information on stainless, alloy, and titanium pipe and tubing up to 40-in. O.D. Full color photos show manufacturing operations. Includes 17 tables and a glossary. ADV 177, 50p.—*Trent Tube Co., E. Troy, Wis. (211A)*

Decorative Concrete Paint

Contains color panels of rubber-base paint that waterproofs and decorates concrete, stucco, concrete block, brick, and stone surfaces. 4p.—*Tropical Paint Co., Cleveland. (211B)*

Powered Globe Valves

Informs on applications and installations of motor-operated globe valves. 4p.—*New England Gear Works, Southington, Conn. (211C)*

Controlled Volume Pumps

Full-color catalog illustrates design features and various models of controlled volume pumps. Includes material resistance chart, selection data guide and sample problems, maintenance instructions, and capacity-pressure selection tables. Bulletin 533-1, 32p.—*Milton Roy Co., Philadelphia. (211D)*

Pressure Regulator

Describes unit for controlling flow of steam and other fluids. Includes photos, line drawings, and suggested applications. Brochure 1011, 4p.—*Spence Engineering Co., Walden, N. Y. (211E)*

Freeze-Proof Steam Traps

Shows working parts of unit that permits escape of condensate by means of action of steam on thermostatic bellows. Unit is especially useful for out-of-door applications. Bulletin 257, 4p.—*V. D. Anderson Co., Cleveland. (211F)*

Extensive Valve Line

Hard cover valve catalog includes pages of engineering data, application tips, valve accessory information, reference data on materials, specifications, and standards. Photos show many units and applications. Catalog No. 57, 244p.—*Darling Valve & Mfg. Co., Williamsport, Pa. (211G)*

Roof Drainage Accessories

Has photos and descriptions of a line of sumps, drains, and other fittings for roof drainage. Manual RK, 6p.—*Josam Mfg. Co., Michigan City, Ind. (211H)*

Glassed Centrifugal Pumps

Explains construction of glass-lined pumps for handling corrosive liquids. Units are stated to resist mechanical and thermal shock. Bulletin 725-C, 12p.—*Goulds Pumps, Inc., Seneca Falls, N. Y. (211I)*

Tank and Barrel Covers

Pictures applications of synthetic fabric used to cover food processing tanks and barrels. 8p.—*Robin W. Adair Co., Inc., Avoca, N. Y. (211J)*

Brass Hose Fittings

Treats of a line of brass hose fittings for low and medium pressure service in conveying air, spray, steam, suction, water, and welding gases. Bulletin 140, 8p.—*Hose Accessories Co., Philadelphia. (211K)*

Self-Contained Boilers

Catalog, in color, describes principles of operation of self-contained boilers. Many special features are offered. Form AD-162, 8p.—*Cleaver Brooks Co., Milwaukee. (211L)*

Motor Starters, Contactors

Clearly illustrated booklet explains principles of motor starters and contactors that are stated to be designed to assure full-rated capacity, maximum motor protection, longer life, and easy maintenance. Sizes run to 400 hp. and a special principle of arc interrup-

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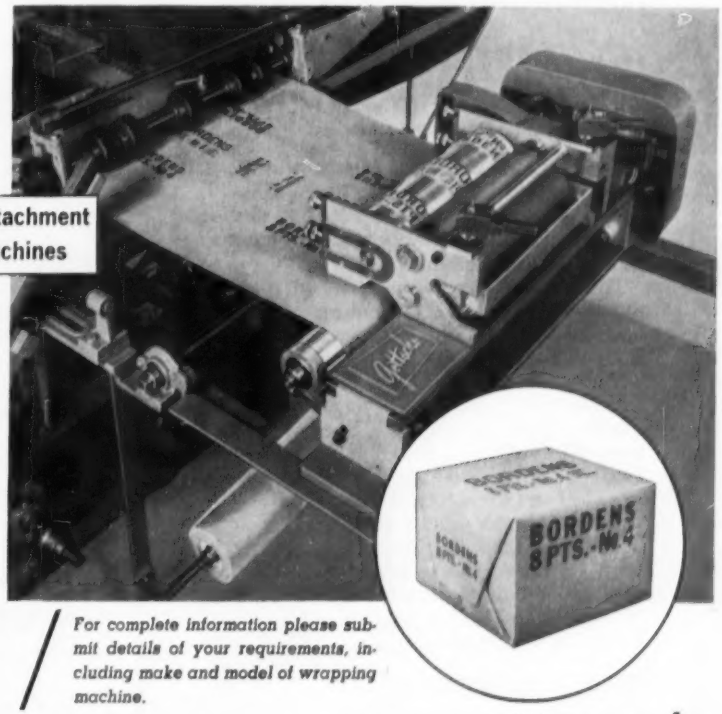

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Gyro-Whip Sifters

Amazingly compact, yet big in output, Gyro-Whip Sifters save floor space. Simplified design reduces maintenance and cleaning time and makes possible the most rigid standards of sanitation.

The average Gyro-Whip is only 48" high, requires only 3½' x 3½' floor space, and operates on only ¾ h.p. Bolting areas range from 47.5 up to 95 sq. ft.

These Gyro-Whip Sifters are available in sizes from 3-sieve to 20-sieve mounted models. Also available are free-swinging supersifters with as many as 180 sieves. Can sift from 2 mesh up to 325 mesh. Stainless steel and wood construction. Aspirator tips to air wash graded products can be provided. Installation can be on the stream. It is a self-contained unit, ready to be bolted down and connected to existing spouting.

Write for Bulletin 135-A.

PR/503-P

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tion is described as eliminating the need for conventional blow-out coils. Bulletin 14B8615, 12p.—*Allis-Chalmers Mfg. Co., Milwaukee. (211M)*

Stainless Steel Castings

Discusses company's line of stainless steel sand castings. Table lists specifications of common stainless steel alloys. Publication 12045, 4p.—*Alloy Steel Casting Company, Southampton, Pa. (212A)*

Gas and Oil Burner Fittings

Two catalogs cover blast-type pilots for ignition of gas or oil burners and flanged gas burner nozzles. Diagrams, photos, and tables cover specifications and installation instructions. Catalog 811, 804-D, 804-LE, 10p.—*Hauck Mfg. Co., Brooklyn, N. Y. (212B)*

Eliminating Smoke and Odor

Several sheets provide information on a deodorizer liquid and some simple units for evaporating the fluid. 6p.—*Aireactor Corp., New York City. (212C)*

Automatic Steam Generators

Illustrates construction of a line of completely shop assembled automatic gas or oil-fired steam generators. Specifications for units running to 600 hp. are tabled. Bulletin SB-56, 8p.—*Erie City Iron Works, Erie, Pa. (212D)*

Spray Coating Data Sheet

Releases technical specifications on Vinyl paints that spray-on in extra-thick coatings. 2p.—*J. Landau and Company, Carlstadt, N. J. (212E)*

Durable Machinery Parts

Tables important engineering data for a line of special alloy machinery parts. Case histories of successful applications, general data, and machining information are also included. Bulletin F 30,-064, 44p.—*Haynes Stellite Co., Kokomo, Ind. (212F)*

Pneumatic Conveying Valves

Shows operation of a valve for controlling flow of solids in suspension. Full round port of unit is stated to eliminate plugging of line and it has no pockets for food decay. 6p.—*Red Jacket Co., Carnegie, Pa. (212G)*

Fresh Foods Cooling Data

Briefs on right storage conditions to best maintain quality on a wide variety of fresh foods. Concepts and principles of operation of a fresh food cooling system are described. Bulletin TV 380, 12p.—*Kramer Trenton Co., Trenton, N. J. (212H)*

INSTRUMENTS

Rapid Moisture Tester

Features moisture-testing unit that reads results directly in percent moisture, 6 min. after ground-up sample is inserted. Built-in memory unit stores results until needed. 1p.—*C. W. Brabender Instruments, Inc., South Hackensack, N. J. (212I)*

Photoelectric Control Units

Concerns compact unit that provides photoelectric control for many operations. 3p.—*Mason Instrument Co., Mt. Vernon, N. Y. (212J)*

Electrical Stop Clock

Includes exploded view of electrical stop clock, showing design principals. Unit can be used as industrial or laboratory reset time totalizer. Specific application possibilities are suggested. Bulletin PB691, 4p.—*Cramer Controls Corp., Centerbrook, Conn. (212K)*

Process Data System

Attractively illustrated booklet explains principles and operation of data system stated as being practical for the process industries. 8p.—*Beckman Systems Div., Anaheim, Calif. (212L)*

Stainless Liquid Meter

Describes unit for metering corrosive liquids. Includes cutaway illustrations, meter and register specifications, and list of liquids that can be measured. Bulletin 95/10, 4p.—*Neptune Meter Co., New York City. (212M)*

Condensed Control Catalog

Contains applications, ranges, and detailed literature references for a line of transmitting, recording, indicating, and controlling instruments. Bulletin G15-1, 8p.—*Bailey Meter Co., Cleveland. (212N)*

Easy-to-Read Rotameter

Gives detailed specifications, capacity, and dimension data for a flow meter reported to have improved design for better service, extra scale length for greater readability, and needle valves for flow control. Bulletin 121, 2p.—*Brooks Rotometer Co., Lansdale, Pa. (212O)*

High-Temperature Hot Water

Employs diagrams to aid in the selection and application of controls for high temperature water installations. Bulletin D31, 4p.—*McDonnell & Miller, Inc., Chicago. (212P)*

Automatic Limit Controllers

Points out how limit controllers can be used for automatic control of weight, size, force, thickness, flow, stress, or other physical

Reduce your refrigeration costs!

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JUNIOR CATALOG 58-G

For details and a representative listing of the most complete floor truck line in America write for Bulletin "D" and Junior Calalog 58-G.

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MSG controls the over-all flavor features of quality protein foods. By blending and strengthening their naturally fresh taste MSG can create a uniform flavor identity the consumer recognizes. It is economical and easy to use.

Always rely on Great Western MSG to accentuate and maintain the fine fresh flavor characteristics of your product. Insure *uniform flavor-quality* to develop dependable customer brand preference.

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qualities. Suggested applications are shown. Bulletin 562, 4p.—*Daytronic Corp., Dayton, Ohio. (212Q)*

Smooth Bore Flow Meter

Describes sanitary flow meter that operates on electro-caloric principle. 4p.—*Industrial Development Laboratories, Inc., Jersey City, N. J. (215A)*

Auto-Proportioning System

Introduces a continuous automatic proportioning system stated to reduce manufacturing costs and materials loss and assure better quality control. Special flow meters coupled with electronic units and control valve are included. Bulletin L6, 2p.—*Potter Aeronautical Corp., Union, N. J. (215B)*

Plastic Sealing Compound

Treats of synthetic rubber compound specially formulated for glazing, sealing, and calking. Application to material and building construction is described. 8p.—*David E. Long Corp., New York City. (215C)*

Dial Head Thermometers

Pictures craftsmanship involved in creating custom calibrated dial head thermometers. Stresses construction features. Form 51E, 2p.—*W. C. Dillon & Co., Van Nuys, Calif. (215D)*

INGREDIENTS

Vitamin C in Frozen Fruit

Revised guide gives valuable information on proven methods of protecting color and flavor of more than a dozen different fruits in freezing with Vitamin C. 36p.—*Hoffman-LaRoche, Inc., Nutley, N. J. (215E)*

Protein-Bread Concentrate

Explains the need for, and the applications of a high protein, low-fat concentrate for use in bread. 12p.—*Wisconsin Alumni Research Foundation, Madison, Wis. (215G)*

Hydrolyzed Protein

Contents of technical booklet on hydrolyzed vegetable protein includes introduction, product description, and general properties. Also, applications to many foods including meat, frozen foods, fruits, poultry, and seafood as well as label requirements, and shipping information. Form 808, 12p.—*Hercules Powder Co., Wilmington, Del. (215H)*

Mold and Rope Inhibitors

Discusses use of calcium and sodium propionate as organism inhibitors in various bakery products. Typical analyses and data on commercial white bread are also included. Bulletin G-102, 4p.—*Eastman Chemical Products, Inc., Kingsport, Tenn. (215F)*

Antioxidant for Nuts

Comprises technical data illustrating the effectiveness of various antioxidants in extending the storage life of several kinds of nuts. Includes details of methods of applying agent. 4p.—*Eastman Chemical Products, Inc., Kingsport, Tenn. (215I)*

Protein Recovery Agent

Lists advantages and applications, and explains the use of a special agent that precipitates water-soluble proteins. Bulletin 105B, 4p.—*West Virginia Pulp & Paper Co., Charleston, S. C. (215J)*

PROCESSING

Heavy-Duty Liquid Mixers

Illustrates change can mixers, kneaders, roller mills, paste mixers, and dissolvers. Brochure 3C, 4p.—*Charles Ross & Son Co., Brooklyn, N. Y. (215K)*

Line of Spray Nozzles

Catalogs offering of spray nozzles with wide application. Clear-view section drawings show important design features, and a great deal of engineering and dimensional data are included. 30p.—*Spray Engineering Co., Burlington, Mass. (215L)*

Sanitary Agitator Kettles

Comprises photographs, drawings, and descriptions of a line of agitator kettles with special sanitary refinements. Many shapes, styles and sizes are available. Bulletin TAK-2, 4p.—*Groen Mfg. Co., Chicago. (215M)*

Many Processing Units

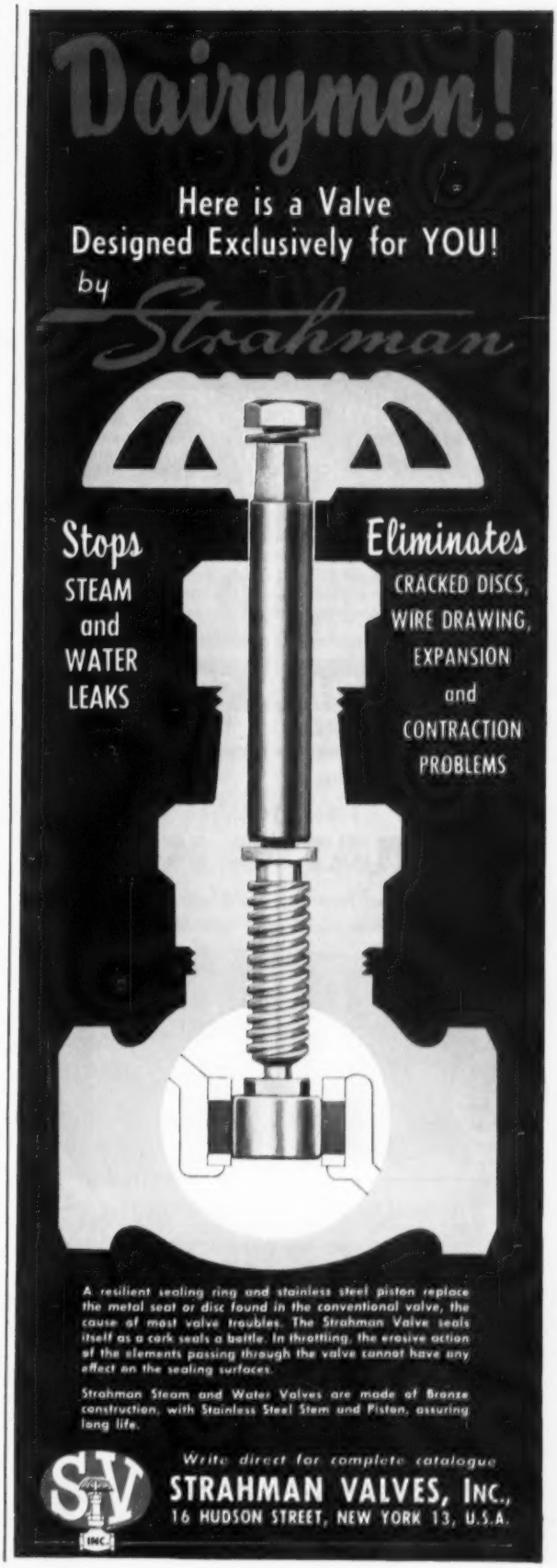
Shows equipment for pulverizing, fiberizing, granulating, blending, cleaning, separating, dehulling, and roasting. Bulletins containing detailed information on each type of equipment are listed. Bulletin 57, 4p.—*Bauer Bros. Co., Springfield, Ohio. (215N)*

Automatic Cake Pan Coaters

Lists improvements on cake pan coating units said to result in new operating economies, efficiency, sanitation control, and better product. Text and drawings give details. Bulletin 657, 4p.—*J. H. Day Co., Cincinnati, O. (2150)*

Centralized Filtering Systems

Describes parts, principles, and applications of centralized filtration systems that feature easy cover access, sludge agitation,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A resilient sealing ring and stainless steel piston replace the metal seat or disc found in the conventional valve, the cause of most valve troubles. The Strahman Valve seals itself as a cork seals a bottle. In throttling, the erosive action of the elements passing through the valve cannot have any effect on the sealing surfaces.
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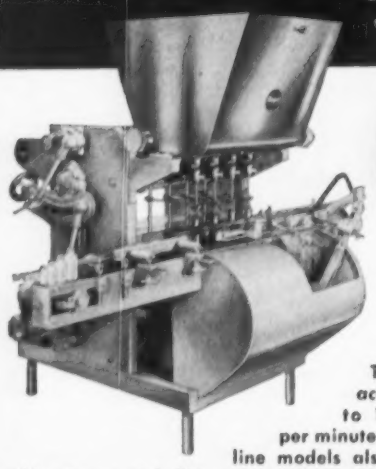

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TYPE 19A

The 4 line model *accurately* fills 50 to 100 containers per minute . . . 6, 8 and 10 line models also available capable of *accurately* filling up to 250 containers per minute. Hope Type 195 Filling Machines are now in *profitable* use from coast-to-coast filling liquids, semi-liquids or viscous products in jars, plastic bottles or tin cans. For high speed, accurate filling machines look to the leader —

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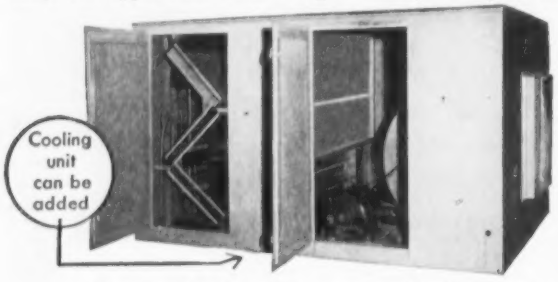
KLIMATIC KING

a compact heating, ventilating unit

Ideal for applications where high humidity is a problem



Designed for dairy, ice cream and food processing plants, the Klimatic King is fabricated with a corrosion-resistant galvanized steel casing, insulated to eliminate condensation and dripping. Automatic controls for temperature and ventilation. Two speed motor for "high" and "low" production periods, provides maximum economy of operation. These and many other features are standard with the Klimatic King, not "optional extras". The quality leader in its field. Sizes 3,500 to 20,000 CFM.

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THE King CO. OF OWATONNA

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MANUFACTURERS OF SHARP FREEZE, COOLING, VENTILATING AND HEATING SYSTEMS

quick changing of screens, and a variety of filter screen types. Bulletin FB 100, 4p.—*U. S. Hoffman Machinery Corp., New York City. (215P)*

Continuous Mixing Equipment

Describes line of single and double shaft heavy-duty mixers and blenders, and special units for high volume requirements. 4p.—*William A. Anthony Engineering Co., Cleveland. (216A)*

Centrifugal Heat-Flow Units

Concerns heat transfer units for treating products arranged in a thin film. Low and high viscosity products can be handled. Bulletin 575, 4p.—*Kontro Co. Inc., Petersham, Mass. (216B)*

SANITATION

Aerosol Disinfectant

Pictures and describes equipment for jetting aerosol said to destroy germs and molds of the air without deteriorating the products with which it comes into contact. 12p.—*Societe du Dome, Paris, France. (216C)*

Ultrasonic Cleaner

Reports on effectiveness of an ultrasonic cleaning unit for small parts. Catalog 56-209, 16p.—*Bendix Aviation Corp., Davenport, Ia. (216D)*

Food Waste Disposers

Describes units that grind food waste for disposal into sewers. Machines are stated to be easy to maintain and designed for easy in-line installation. 8p.—*Herlex Mfg. Co., Norwalk, Conn. (216E)*

Self-Sanitizing Paint Additive

Bulletin has color photographs demonstrating bactericidal results obtained by adding self-disinfecting agent to paint. Treated coating has long-lasting killing action against fungi and bacteria. Bulletin NLI-57-15, 3p.—*Nuodex Products Co., Elizabeth, N. J. (216F)*

Floor Cleaning Procedure

Describes step-by-step maintenance for terrazzo and oxychloride floors. Cautions against treatments that can harm surface. Cleaning products are shown. Form 1405, 4p.—*Multi-Clean Products, Inc., St. Paul, Minn. (216G)*

Automatic Drum Cleaner

Has specifications for unit designed to thoroughly clean covers and drums inside and out. Automatic loading techniques, production cost studies, operator safeguards, and engineering data are also covered. Bulletin 220, 4p.—*Pangborn Corp., Hagerstown, Md. (216H)*

Wet-Dry Vacuum Cleaners

Pictures applications of heavy-duty units stated to slash labor in floor maintenance. Specifications for four different models are listed. Form 698, 6p.—*Clarke Sanding Machine Co., Muskegon, Mich. (216I)*

MAINTENANCE

Enzymatic Grease Interceptor

Informs on the use of enzyme concentrates for grease interceptor cleaning. Self-cleaning unit is stated to end the chore of grease trap cleaning. Form 20, 4p.—*J. A. Zurn Mfg. Div., Erie, Pa. (216J)*

Concrete Floor Maintenance

Outlines stepwise maintenance program for concrete floors. Equipment for performing each step is cataloged. Form 1404, 4p.—*Multi-Clean Products, Inc., St. Paul, Minn. (216K)*

Many Welding Applications

Explains principle of welder that needs no flux, even on aluminum, magnesium, and stainless steel. Photos show a variety of applications. Bulletin F-6291D, 8p.—*Linde Co., New York City. (216L)*

Chemically Inert Gaskets

Colorful brochure informs on line of gaskets, back-up rings, and O-rings. Includes service and mechanical recommendations, data on operating pressures and standard sizes, and dimensional details. Gaskets are unaffected by most chemicals at elevated temperatures. Bulletin P-327, 6p.—*Crane Packing Co., Morton Grove, Ill. (216M)*

Heavy-Duty Bearing Grease

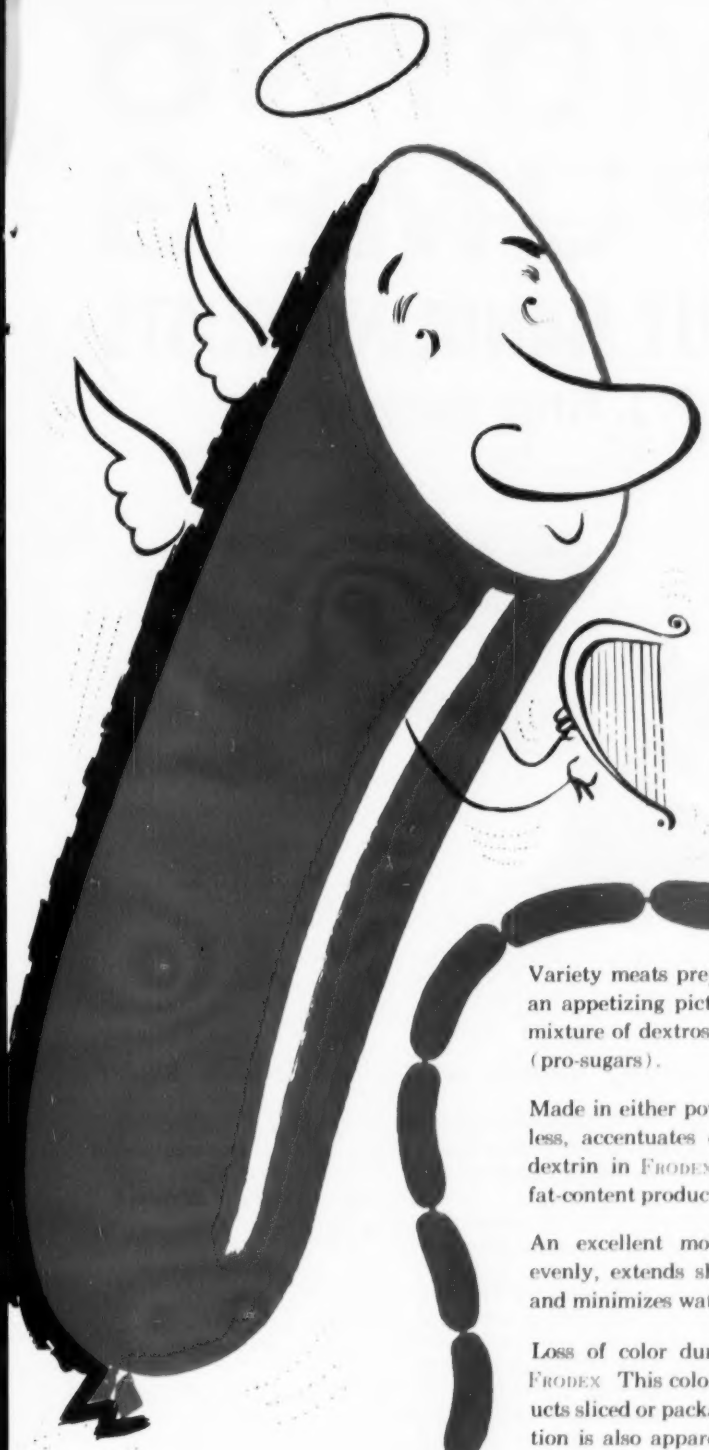
Discusses silicone-based lubricants developed for high-speed, high-temperature bearings. Has data, tables, application illustrations. Code 6-209, 4p.—*Dow Corning Corporation, Midland, Mich. (216N)*

Better Welding of Stainless

Answers questions that arise in welding stainless steel for beginners and experienced welders. Drawings and close-up photos clarify problems. 20p.—*Arcos Corp., Philadelphia. (216O)*

Battery Maintenance Manual

Encompasses most phases of battery maintenance, repair, and selection. Diagrams and tables re-



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FRODEX

CORN SYRUP SOLIDS

Variety meats prepared with FRODEX (corn syrup solids) make an appetizing picture in any showcase. FRODEX is a powdered mixture of dextrose, maltose, higher sugars and edible dextrins (pro-sugars).

Made in either powdered or granular form, FRODEX, itself tasteless, accentuates delicate meat and spice flavors. The edible dextrin in FRODEX firms the product, aids in stability of high fat-content products and binds the particles of meat together.

An excellent moisture conditioner, FRODEX holds moisture evenly, extends shelf life, improves texture, reduces shrinkage and minimizes watering off.

Loss of color during processing and storage is reduced with FRODEX. This color stabilization is particularly effective in products sliced or packaged in transparent wrappings. Color stabilization is also apparent in cured, smoked and preserved meats.

Write for full information and special data about FRODEX for variety and luncheon meats.

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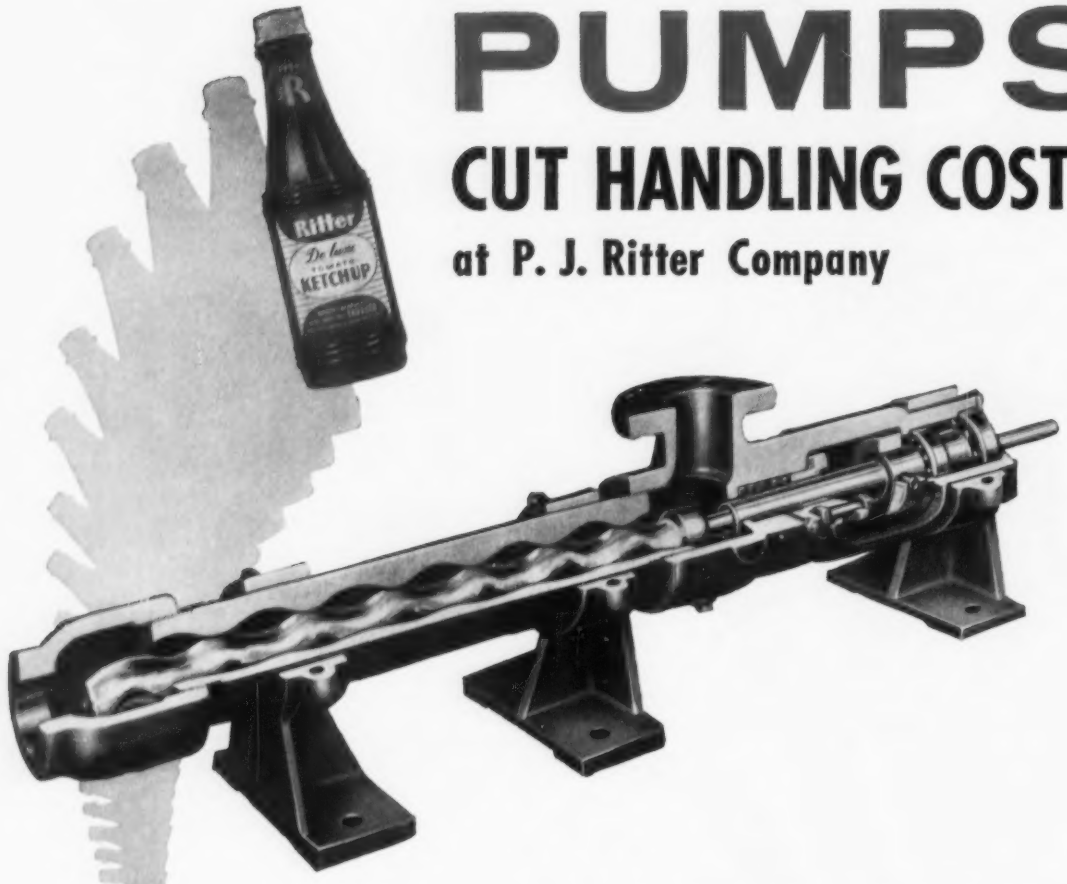
MOYNO® PUMPS
CUT HANDLING COSTS
at P. J. Ritter Company



...pumping tomato seeds and 5-15% water

The Moyno "progressive cavity" pumping principle has enabled thousands of plants to pipe difficult materials that were transported by hand and other expensive means. For example, The P. J. Ritter Co., famous food packers since 1854, have increased efficiency by installing seventeen Moyno Pumps. The one shown at the left is pumping tomato seeds in 5-15% solution at 10 gallons per minute. The pump runs at 600 RPM.

Moyno is the only pump that will handle many difficult materials such as abrasives, pastes, slurries, chemicals, foods, suspended solids, etc., without foaming, aerating, crushing or excessive pump wear.

Examine your processing methods. No doubt there are several places where Moyno Pumps can drastically cut costs. Ask us, we'll give you a prompt answer. Send us an outline of your problem today! Write for Bulletin 30-FE.

ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO / BRANTFORD, ONTARIO

Motors Fans Hoists Moyno® Pumps Propellair® (Industrial) Fans

view battery theory and construction, demonstrate proper selection, illustrate charging method and equipment, show testing techniques, and present correct battery-room layout. Enables supervisors to conduct a battery training course in their own plant. Bulletin GB-1599 A, 41p.—*Gould-National Batteries, Inc., Trenton, N. J. (216P)*

Reducing Cleaning Costs

Explains how to use measured work techniques to reduce cleaning and maintenance costs. Attractive presentation includes standard job-time list. 28p.—*Advance Floor Machine Co., Minneapolis. (219A)*

Concrete Floor Coating

Has colored panels of high gloss finish for concrete floors. Rubber-base paint withstands frequent washing. 4p.—*Tropical Paint Co., Cleveland. (219B)*

Bacterial Food Poisoning

Review covers types, causes, and controls of bacterial food poisoning. Includes large bibliography. Bulletin 493, 39p.—*University of Massachusetts, Amherst. (219C)*

MATERIALS HANDLING

Permanent Dock Boards

Describes line of standard magnesium dock boards for installation on concrete docks. Bulletin DB 215, 2p.—*Magline Inc., Pinconning, Mich. (219D)*

Platform Truck, Tractor

Lists specifications of warehouse truck and tractor, both with air-cooled engines. Units are stated to have automatic drive, excellent maneuverability. Forms 1478A, 1480A, 4p.—*Hyster Co., Portland, Oregon. (219E)*

Rubber Tired Casters

Has detailed specifications of cushion caster units that feature heavy steel top plate, offset swivel fork, tapered roller bearings. Bulletin 301, 4p.—*Roll-Rite Corp., Oakland, Calif. (219F)*

Industrial Truck Line

Includes offering of gas and LPG fork lift trucks in capacities from 1,000 to 7,000 lb. and electric units running from 1,000 to 1,500 lb. Also electric platform trucks and crane trucks. Technical data covers construction features and special attachments. Bulletin 57, 12p.—*Baker-Raulang Co., Cleveland. (219G)*

5,000-lb. Capacity Truck Lift

Compact listing of essential information on a lift truck of 5,000 lb. maximum capacity is included in charts, tables, drawings and text. Construction features are noted in blow-up photos. Bulletin SS-2091, 6p.—*Clark Equipment Co., Battle Creek, Mich. (219H)*

Flour Dump and Sifter

Describes operation of combination dump bin, sifter, and conveyor for handling dry material similar to wheat flour. Sheet B-106-RA, 2p.—*J. H. Day Co., Cincinnati. (219I)*

Adjustable Steel Shelving

Photos show wide variety of steel shelving arrangements. Specifications covering design and construction details are presented. Bulletin SE5, 6p.—*Alan Wood Steel Co., Oaks, Pa. (219J)*

Material-Handling System

Depicts detachable steel containers handled by standard trucks equipped with specially engineered hydraulic hoists. Special containers and accessories are available. Bulletin 457, 12p.—*Borg-Warner Corp., Kalamazoo, Mich. (219K)*

Chain-Block Safety Chart

Cartoon-type illustrations, on a chart, show safe and unsafe applications of chain-blocks. Offering of chain-block equipment is on back of sheet. 8p.—*Manning, Maxwell & Moore Inc., Muskegon, Mich. (219L)*

Compact Design Lift Truck

Outlines specifications and components of lift truck only 5 ft. in length. Units have 52-in. turning radius, 4 forward speeds to 6 mph. Other features are covered. 4p.—*Hustler Corp., Willoughby, Ohio. (219M)*

Improved Hydraulic Elevator

Describes late-model foot and battery-operated hydraulic elevators. Standard units have 750 lb. capacity. Bulletin 55A, 6p.—*Barrett-Cravens Co., Northbrook, Ill. (219N)*

Bulk Materials Handling

Color booklet describes bin system including automatic filling and discharging stations. Inter- and intra-plant applications of aluminum bins and tilts are shown. Specifications and construction of the equipment are clearly detailed. Catalog 6, 20p.—*Tote System Inc., Beatrice, Nebraska. (219O)*

Pneumatic Bulk Conveying

Over 70 illustrations show how air can transport powdered material efficiently. Detailed technical information on how pneumatic conveying solved many bulk handling problems is presented. Materials that can be handled are listed, and specially-engineered systems are

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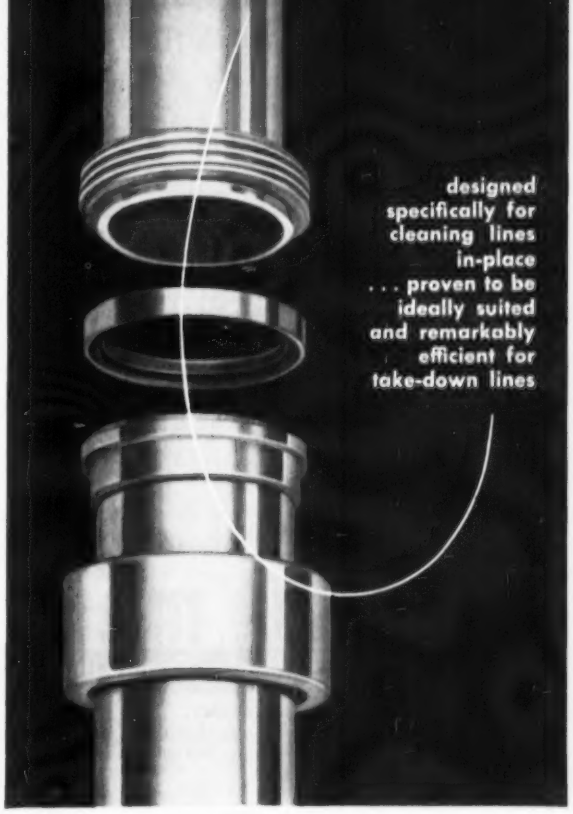
APV PARA-SEAL FITTINGS
all stainless—crevice free


designed specifically for cleaning lines in-place . . . proven to be ideally suited and remarkably efficient for take-down lines

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- Exceptionally long gasket life
- Self-locating gasket for ease of assembly
- Designed for high-pressure operation

Our new 12 page brochure gives you the complete facts and figures on APV PARA-SEAL all stainless — crevice free fittings. May we send you a copy?

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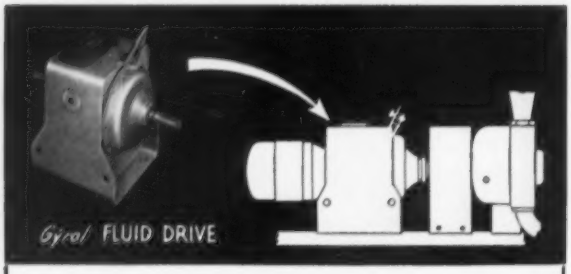

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Positive displacement pumps are ideally driven by an induction motor—Gyrol Fluid Drive combination.

Simple, stepless, accurate control through the Fluid Drive adjusts pump speed, flow and pressure without excessive build-up or need for bypasses. Proper selection of motor and Fluid Drive permits products of various viscosities to be handled without damaging overloads to motor or pump.

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HIGH PRODUCTION ....
Production records achieved under actual plant operating conditions proves the tremendous capacity of this mill. No machine of similar size or cost matches the production of the Jayhawk Mill..

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All Jayhawk mills are guaranteed to be free of any defective material or workmanship.

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Compactness designed into the Jayhawk Mill enables it to occupy only a small fraction of valuable plant area.

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No maintenance trouble with the Jayhawk Mill. The rugged heavy duty thrust bearings have ample strength to withstand severe service.

EXCLUSIVE DESIGN FEATURES THAT GIVE LONG DEPENDABLE SERVICE

- **STRENGTH** to withstand severe service
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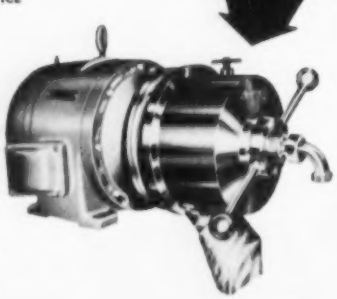
- **SIMPLICITY** so that any operator can handle it.



Mills of Quality
For Quality Production

Jayhawk Manufacturing Co., Inc.
120 North Adams Hutchinson, Kansas

described. Bulletin 520, 32p.—*Dracco Corp., Cleveland. (219P)*

Handling—6 Case Histories

Half-dozen folders show how six different food processing firms solved their materials handling problems. 24p. — *Lewis-Shepard Products, Inc., Watertown, Mass. (220A)*

Tape Binding of Cartons

Two folders show tape binding units ranging from hand to automatic ones that handle 5 units per min. Tape specifications and typical applications are detailed. Forms 710-1300-457, 710-2000-757, 10p.—*A. J. Gerrard & Co., Melrose Park, Ill. (220B)*

Rubber Conveyor Belts

Provides reference on rubber conveyor belt design, including information on types and forms of material, design angles for various conveying jobs, applications of different types of belts, and splicing services and materials. Supplement sheet covers Mylar belts. Catalog 124, 10p.—*United States Rubber, New York City. (220C)*

MANAGEMENT

Engineering Talent Service

Illustrates facilities of company offering custom engineering service. 8p.—*Associated Engineers, Inc., Springfield, Mass. (220D)*

Brewers Academy Prospectus

Gives complete details regarding three brewing courses to be held during 1957-58 session. 60p.—*United States Brewers Academy, Mount Vernon, N. Y. (220E)*

Guide to Trademark Matters

Discusses mutual problems of trademark owners, and how association aids them. 20p.—*United States Trade Mark Association, New York City. (220F)*

Corn Research Center

Depicts facilities of modern corn products research center, as well as important projects being studied there. 16p.—*Clinton Corn Processing Co., Clinton, Iowa. (220G)*

Tomorrow's Engineering

Cites case histories of successful engineering achievements from preliminary management action through design to sales. Detailed information describing modern engineering services is given. Bulletin E-5273, 12p.—*Teller Co., Butler, Pa. (220H)*

Research and Development

Lists specific areas that technical staff is equipped to perform research and development on. Main headings include product planning and design, materials, production, and processes. Completed and current projects are mentioned. 20p.—*Franklin Institute Laboratories, Philadelphia. (220I)*

Working Funds for Industry

Compares, objectively, basic methods of securing money for business. Actual 5-year experience of one company is worked out in tabular and graphic form. 13p.—*Walter E. Heller & Co., Chicago. (220J)*

Staff Aids Customer Problem

Describes qualifications of technical personnel assigned to assist customers in the installation of grinding systems, agitators, blenders, vacuum driers, and processing plants. 10p.—*Patterson Foundry & Machine Co., East Liverpool, Ohio. (220K)*

PACKAGING

Automatic Bagging Scales

Has specifications for overhead stationary, overhead portable, and floor portable automatic bagging scales. Photos and dimension drawing aid description. Bulletin 0357, 6p.—*Richardson Scale Co., Clifton, N. J. (220L)*

Precision Over-Under Scales

Combines, in one binding, catalogs on end tower, center tower, fan dial, platform, sacking, and automatic check-weighing scales. Also weighing machines. Each presentation includes complete descriptions with drawings and photos. Form 3334, 59p.—*Exact Weight Scale Co., Columbus, Ohio. (220M)*

Tandem Labeling Machines

Contains close-up photos of important operating features of a line of labeling machines that can be operated in tandem. Clearly explains functioning and construction of the units and their installation. Drawings, floor plans, and specifications also included. Bulletin TB-219, 32p.—*Economic Machinery Co., Worcester, Mass. (220N)*

Adhesives for Canners

Colorful booklet lists technical specifications on adhesives for case sealing, water resistance, pick-up, lap ends, spot labeling, and glass labeling. 14p.—*H. B. Fuller Co., St. Paul, Minn. (220O)*

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

How to Find the Strength of Salt Brines—Accurately

In most of today's plants, the type of hydrometer called a Salometer can generally be used to measure the strength of salt brines most accurately. This device (similar in principle to the hydrometer which checks the condition of your car's battery) is convenient to use—and its scale permits fast calculations for a variety of plant needs. The Salometer scale reads from 0° in pure water to 100° in saturated brine, with each degree representing a percentage of fully saturated brine.

Using the Salometer with maximum accuracy, however, isn't just a matter of reading the scale. A number of simple precautions must also be taken to make sure the Salometer records correct brine strength. Here they are:

1. Check the temperature of the brine. Since most Salometers are calibrated for reading at 60° F., brine temperature should be kept at this level during testing. When other brine temperatures are encountered, it is necessary to use the following table of simple correction factors. These will help provide a completely accurate measurement of brine strength.

APPROXIMATE CORRECTION IN SALOMETER DEGREES

Observed Salometer reading	Subtract per degree below 60° F.	Add per degree above 60° F.
0 to 10	0.049	0.060
11 to 20	0.064	0.082
21 to 30	0.077	0.094
31 to 40	0.087	0.103
41 to 50	0.095	0.112
51 to 60	0.102	0.118
61 to 70	0.107	0.123
71 to 80	0.112	0.128
81 to 90	0.116	0.131
91 to 100	0.120	0.134

For measuring cold brines, such as those used in meat-packing plants, special 38° F. Salometers may be used. Special temperature-correction factors are available when using this type of Salometer to test brines above or below 38° F.

2. Brine should be tested only in a straight-walled cylinder made of clear glass—set on a level surface. Any moisture that collects on the outside of the cylinder should be wiped off before testing procedures start.

3. Salometer stem must be thoroughly dry, clean, and free from grease or caked salt crystals. Also, the Salometer should not touch the sides of the cylinder when readings are taken. It should be read with the stem in a vertical position.

4. Check new Salometers by placing them first in clear water; reading should be 0° S. Then empty the cylinder, rinse with a saturated salt solution, and refill with fully saturated brine; reading should be 100° S. Both water and brine should be at 60° F.

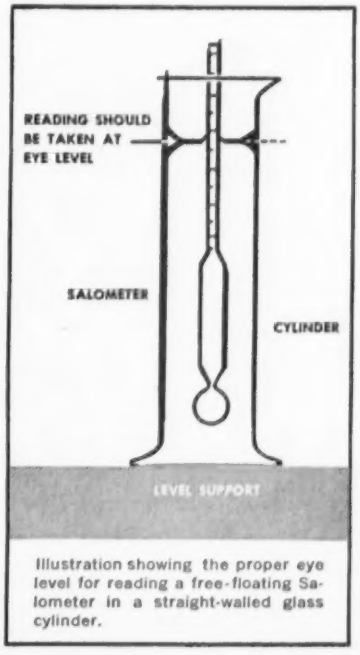


Illustration showing the proper eye level for reading a free-floating Salometer in a straight-walled glass cylinder.

5. Correct reading technique. Brine tends to rise along the sides of a glass cylinder, forming a concave surface known as a meniscus. For correct reading, the eye should be brought to a point level with the *bottom* of this meniscus. Errors of two or three degrees are possible if reading is taken at the point where the brine has risen along the sides of the cylinder.

Special Salometers. In the canning industry, where brine is used for quality grading, a different type of Salometer is often used. It's graduated on a scale where 100° S. represents brine containing 25% salt, instead of the normal 26.395%. Special hydrometers may also be used in the tanning or chemical industries. But the same procedures outlined here must always be followed when brine is to be tested—no matter what type of hydrometer a plant uses.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt or brine you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

If you'd like help on any problem concerning salt or brine—or further information on testing brine strength—contact your nearest International sales office.

International Salt Co., Scranton, Pa.
Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, Ohio; Cleveland, Ohio; Philadelphia, Pa.; Pittsburgh, Pa.; Richmond, Va.

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how to move

GASES

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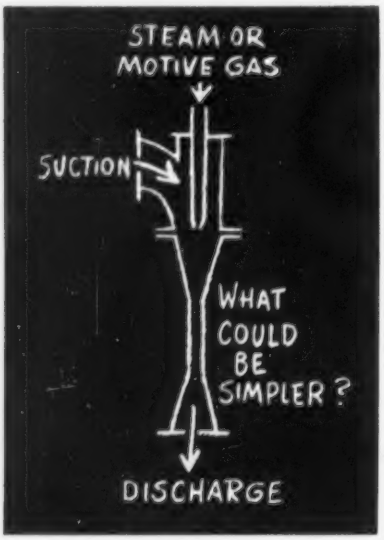

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USEFUL NEW BOOKS

Dairy Worker's Guide

MANUAL FOR EMPLOYEES OF DAIRY PLANTS *by C. L. Roadhouse and B. E. Hubbell. Published by Olsen Publishing Co., 1445 N. 5th St., Milwaukee. 1957. 139 pages, cloth. Price:* $3.50.

To be distributed by dairy plant management to its employees, this book is directed at helping to train the new worker and provide the experienced man with a handy reference.

The book begins with a discussion of the dairy phase of the food industry, detailing annual production, and providing the plant worker with a view of his plant's importance in the national economy. It then proceeds to cover the general problems of sanitation, nutrition, waste disposal.

Part II offers eight chapters dealing with all phases of dairy processing. Part III deals with care of the complicated and expensive dairy equipment. The final section covers milk production.

Handy Plastic Manual

POLYETHYLENE *by Theodore Kresser. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22. 1957. 217 pages, cloth. Price:* $4.95.

First in the publisher's Plastics Applications Series, this handy little manual offers the food man all there is to know about polyethylene.

It covers the history, properties, chemistry, manufacture, processing and applications (with emphasis on film, coatings, pipe, and vacuum formings).

A promising chapter details the future of the versatile plastic.

The book is illustrated and indexed.

Using the Microscope

ANALYTICAL MICROSCOPY *(Second Edition) by T. E. Wallis. Published by Little, Brown, and Co., 34 Beacon St., Boston 6. 1957. 215 pages, cloth. Price:* $5.50.

Specifically dealing with the microscope as a tool for research in foods, water, spices, and drugs, this handy volume is of interest to the food lab man.

Profusely illustrated with photos and sketches, it discusses the preparation of materials for microscopic examination, relying heavily on practical experience for understanding.

Among chapter topics are sedimentation and centrifugation, kneading of starch and bran, solvents and clearing agents, and chemomicroscopy.

Engineers and Design

FUNDAMENTALS OF MECHANICAL DESIGN *by Richard M. Phelan. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1957. 526 pages, cloth. Price:* $8.75.

Another in the publisher's Mechanical Engineering series, the author has integrated into one handy reference book all of the fundamental concepts and a practical application of design engineering. This includes kinematics, mechanism, dynamics of machinery, and design of machine elements.

Though written as a text for engineering courses, the book is of value to food engineers, or even management men, who desire a desk reference or wish to refresh themselves on past studies.

Heavily illustrated with photos and sketches, the book avoids special methods or limited techniques, restricting itself to the broader aspects of the topic.

Publish Abstract Collection

FATS, OILS, DETERGENTS YEARBOOK, 1956. *Published by Interscience Publishers, Inc., 250 Fifth Ave., New York City 1. 1957. 1141 pages, cloth. Price:* $45.

This timely volume offers a collection of abstracts from papers dealing with the properties and behavior of various fats, oils, and detergents. The papers are selected from 1956 journals of the United States and other countries.

Though they are abstracts, the sections are more complete and more graphically illustrated than the conventional abstract. These are made as clear as possible to eliminate the need to refer to the original work.

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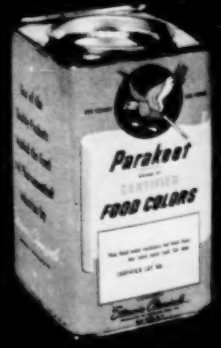

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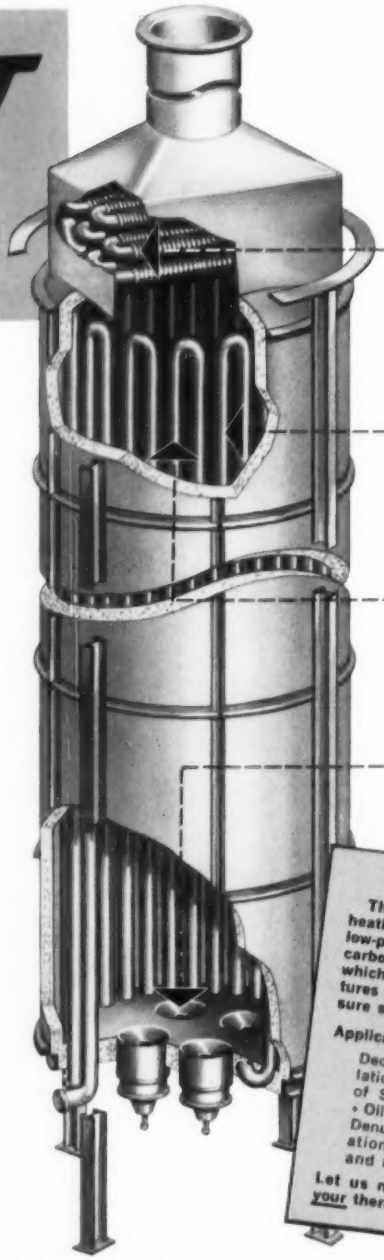

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RECENT INVENTIONS

PRODUCTS

Plastic Shortening Comprising major Portion of Partially Hydrogenated Base Stock, Hard Stock—E. S. Lutton to Procter & Gamble Co., Cincinnati. No. 2,801,177. July 30, 1957.

Pectinic Acid Derived From Enzyme Action on Citrus Peel, Mixed With Potassium Citrate, Sodium Hexametaphosphate, Dextrose, and Water to Form a Gel—H. T. Leo and C. C. Taylor, Anaheim, Calif. No. 2,801,178. July 30, 1957.

Antioxidants for Fats and Oils —G. R. Lappin and C. E. Tholstrup, Kingsport, Tenn. to Eastman Kodak Co., Rochester, N. Y. No. 2,801,254. July 30, 1957.

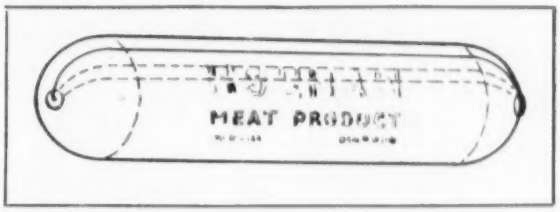
Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Dry Mixture for Producing Baked and Fried Foods, Comprising Flour, Sucrose, Invertase—W. Moses, Teaneck, N. J. to Wallerstein Co., New York City. No. 2,801,921. August 6, 1957.

Confection Consisting of Frozen Core, Cushioning Gelatinous Sheath, Edible Coating —S. Oprean, New York City. No. 2,801,922. August 6, 1957.

Pudding-Composition Comprising Red Seaweed Hydrocolloid Extractive, Calcium and Magnesium Salts of Phosphate, Carbonate, and Sulfate: Forms an Insoluble Precipitate When Mixed With Cold Milk —L. S. Stoloff to Seaplant Chemical Corp., New Bedford, Mass. No. 2,801,923. August 6, 1957.

Pudding-Composition Comprising Alkali Pyrophosphate and Orthophosphate, for Interaction With Milk Protein —A. S. Clausi, Battle Creek, Michigan to General Foods Corp., New York City. No. 2,801,924. August 6, 1957.



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Protein-Product Including Chewy Protein Gel With Thermostable, Hydrated, Unoriented Structure, and Kneaded Dough— M. L. Anson, New York City, and M. Pader, West Englewood, N. J. to Lever Bros. Co., New York City. No. 2,802,737. August 13, 1957.

Fried-Cake Mix Improved by Substituting Water-Soluble Cellulose Ether for at Least Half the Normal Egg Content —M. A. Weaver, Ithaca, and K. D. Bacon and G. K. Greminger, Jr. to Dow Chemical Co., Midland, Michigan. No. 2,802,740. August 13, 1957.

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Cake Mix Containing Water-Soluble Cellulose Ether in Place of Part of Normal Egg White—M. A. Weaver, Ithaca and G. K. Greminger, Jr. to Dow Chemical Co., Midland, Mich. No. 2,802,741. August 13, 1957.

Frozen-Confection Mounted on Handle Having Open-Top Preshaped Container-Guard, Underlying Sponge-Rubber Sealing Block—J. M. Ackalusky, Pottsville, Pa. No. 2,803,550. Aug. 20, 1957.

Sweetening Composition Comprising Salts of Cyclamate, and Saccharin—F. J. Helgren, Waukegan to Abbott Laboratories, North Chicago, Ill. No. 2,803,551. Aug. 20, 1957.

PROCESSES

Forming Dough Into Loaves With Reduced Center Swirls by Passing Individual Dough Pieces Through Sheeting Rolls Operating at Different Speeds, Curling Transversely to Elongation—F. F. Hansen, Pittsburgh. No. 2,800,862. July 30, 1957.

Dehydrating Molasses by Mixing With Yeast Cream, Passing in Thin Film Over Moving Drying Surface—C. Vincenty, Rio Piedras, Puerto Rico to Governor of Puerto Rico. No. 2,801,174. July 30, 1957.

Treating Wine to Remove Metallic Contamination by Adding Aqueous Alkaline Potassium Ferrocyanide Containing a Ferrous Compound—J. H. Fessler, Berkeley, Calif. to Culvinex Co. No. 2,801,175. July 30, 1957.

Preventing Gel in Aqueous Roasted Coffee Extract by Mixing With Mannanase Preparation—I. M. Reich, New York, S. Redfern, North White Plains, and J. F. Lenney, Douglaston, N. Y., and W. W. Schimmel, Dumont, N. J. to Standard Brands, Inc., New York City. No. 2,801,920. Aug. 6, 1957.

Preparing Ready-to-Eat Cereal by Gelatinizing Grain, Drying, Hulling, Shaping, Drying Further—A. K. Ozai-Durrani, Stuttgart, Ark. No. 2,801,136. July 30, 1957.

Extracting Artificially-Added Gaseous Preservative From Cherries by Subjecting to Sub-Atmospheric Pressure, Flooding With Sugar Solution, Allowing to Stand—G. A. Fisher, Selingsgrove, Pa. No. 2,801,925. Aug. 6, 1957.

Preparing Chinese Food Package by Placing Raw, Unseasoned Vegetables in a Can, Sealing, Sterilizing, Canning and Sterilizing Cooked Sauce, Packaging as Single Unit—J. F. Paulucci, Duluth, Minn. No. 2,801,929. Aug. 6, 1957.

Packaging Frozen Chinese Food by Blanching Vegetables, Draining, Separating Sauce and Vegetables in a Single Container, Freezing—J. F. Paulucci, Duluth, Minn. No. 2,801,930. Aug. 6, 1957.

Producing Sugars From Wood by Mixing With Hot Sulphuric Acid, Separating Lignin in More Than One Stage—T. P. Hignett, Sheffield, Ala., and N. Gilbert, Cincinnati, to Tennessee Valley Authority. No. 2,801,939. Aug. 6, 1957.

Recovering Beet Sugar by Extraction With Dilute Ammonia and Carbon Dioxide—J. B. Stark, Berkeley and A. E. Goodban, Walnut Creek, Calif. to USDA. No. 2,801,940. Aug. 6, 1957.

Recovering Starch From Plants by Treating With Pectic Enzyme—M. Damodaran and I. Babbar, Poona, to Council of Scientific and Industrial Research, New Delhi, India. No. 2,801,954. Aug. 6, 1957.

Extracting Hemicellulose From Corn Bran by Treating With Alkali—M. W. Rutenberg and W. Herbst, North Plainfield, N. J. to National Starch Products, Inc., New York City. No. 2,801,955. Aug. 6, 1957.

Preparing Dry Coffee Concentrate Including Steps of Introducing Steam Into Ground Roasted Coffee, Condensing to Form an Extract of Volatile Coffee Constituents, Extracting Coffee, Removing Caffein, Mixing With Volatile Extract—Al Nutting, Berkeley to Hills Bros. Coffee, Inc., San Francisco. No. 2,802,739. Aug. 13, 1957.

Controlling Slime in Sugar Mills by Contacting With Halogen Solution—L. R. Bacon, Wyandotte, J. V. Otrhalek, Dearborn, and A. L. Sotier to Wyandotte Chemicals Corp., Wyandotte, Mich. No. 2,802,757. Aug. 13, 1957.

Refining Soybean Oil by Contacting With Solvents, Withdrawing Extract Phase, Treat-

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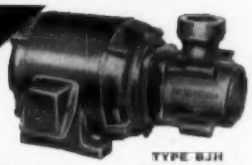

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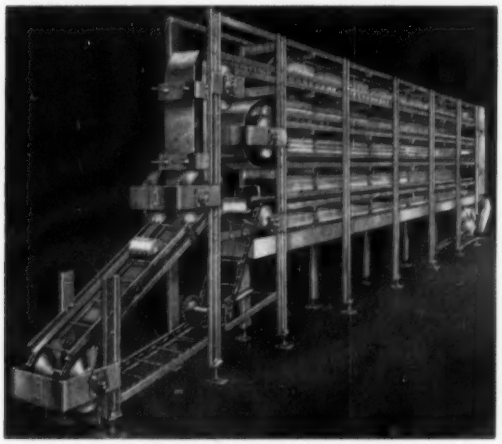

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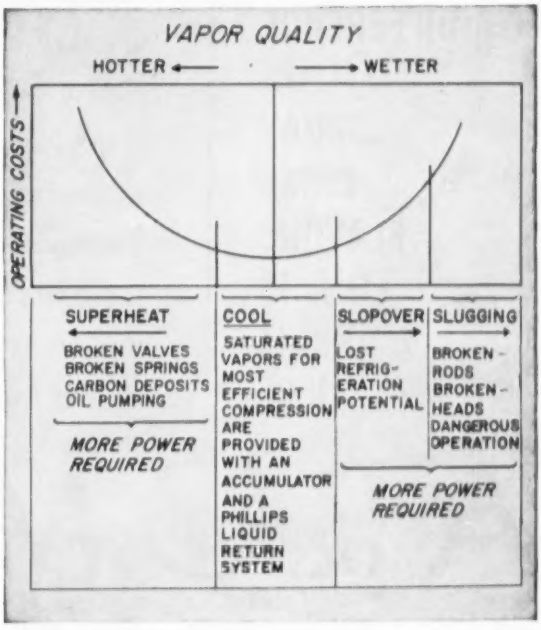

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ing With Steam, Recombining Part of Neutralized Condensate With Extract Oil—A. J. Passino, Englewood, N. J. to M. W. Kellogg Co., Jersey City, N. J. No. 2,802,849. Aug. 13, 1957.

Working a Lump of Fat Emulsion by Sequentially Lifting and Rolling Same to Expel Air and Render Lump Homogeneous—C. A. S. Thornstensson-Rydberg, Stockholm, to J. R. Anderson & Co., Aktiebolag, Sundyberg, Sweden. No. 2,803,529. Aug. 20, 1957.

Dehydrating Stem-Carried Leafy Vegetables by Directing Horizontally in Draft of Combustion Vapor—O. W. Randolph, Toledo, Ohio to A. T. Ferrell & Co., Saginaw, Mich. No. 2,803,545. Aug. 20, 1957.

Producing Alcoholic Malt Beverage Designed for Maximum Sugar Production, Minimum Protein Solution, Minimum Color Development—D. E. Bergmann and F. A. Wilcox, Chicago, A. P. Van der Kloot, Skokie, and R. I. Tenney, Winnetka, Ill. No. 2,803,546. Aug. 20, 1957.

Improving Manufacture of Emulsion-Type Sausages by Incorporating Water-Extractable Proteinaceous Material From Oil-Free Soybean Material—E. F. Glabe, Chicago to USDA. No. 2,803,547. Aug. 20, 1957.

Making Gelatin-Containing Powder That Rapidly Dissolves in Cold Water and Sets at Room Temperature, by Steps of Disbursing in Saccharine Solution, Heating, Evaporating, Pulverizing—E. B. Hagerty, Whittier, Calif. to Louis Milani Foods, Inc., Los Angeles. No. 2,803,548. Aug. 20, 1957.

Producing Candy by Mixing Sugar, Glucose, Shortening, Milk; Boiling at 242F., Cooling, Heating With Dextrose, Flavoring, and Purified Bone Meal, Pouring Into Molds—J. A. Bernard, Cincinnati, and R. Verdin, Hamilton, Ohio. No. 2,803,549. Aug. 20, 1957.

Recovering Amylose From Starch Including Addition of Special Compound to Aid Starch Precipitation — W. C. Bus, The Hague, and J. Muetgeert, Rotterdam to Cooperatieve Verkoop-en Productievereniging van Aardappelmeel en Derivaten "Avebe" G.A. Veendam, Netherland. No. 2,803,568. Aug. 20, 1957.

Removing Fat From Solid Material by Hammering in Water, Discharging Through Small Openings—I. H. Chayen, London, England to C.D.D. Processes (N. Y.) Ltd. No. 2,803,634. Aug. 20, 1957.

EQUIPMENT

Hamburg Patty-Forming Machine That Has Rectangular Slot for Extruding Strip, Knife For Severing Patties From Extruded Strip.—C. F. Spang, Wessesley and C. E. Clarke, Winchester to Needham Mfg. Co. Inc., Needham Heights, Mass. No. 2,795,816. June 18, 1957.

Eviscerating Poultry by Introducing Air Under Pressure Through Opening Between Neck and Breast to Expel Viscera Through Opening Near Vent.—J. H. Dahlberg to C. A. Swanson & Sons, Omaha, Nebr. No. 2,795,817. June 18, 1957.

Canned-Tuna Dicer With Support. Reciprocating Cutter, Means to Rotate Can so as to Cut Material in Two Directions, Stripper.—A. L. Christiansen, Compton to A. S. Ostoich, San Pedro, Calif. No. 2,795,908. June 18, 1957.

Plate-Freezer Having Vertical Plates, Package Support Means.—I. H. Polk, San Jose to W. R. Graham and C. Mason, Los Angeles, J. S. Drum, Jr. and E. L. Morris, San Francisco. No. 2,795,939. June 18, 1957.

Food-Slicing Machine Having Bowl With Open Ends, Rotating Shaft Movable Vertically Through Bowl, Disk Having Knife Slots at Bottom of Shaft, Adjustment Means.—E. Feinstein, New York City. No. 2,796,103. June 18, 1957.

Meat-Grinder Having Bearing Pins Arranged Around Feed Screw Shaft Through Opening in Perforated Plate.—J. A. Klod, Chicago. No. 2,796,104. June 18, 1957.

Poultry Tank Dumping Device Comprising Tank Holder, Frame with Arcuate Track, Roller Arm, Drive Means.—W. F. Altenpohl, Jr., Philadelphia. No. 2,797,003. June 25, 1957.

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Fruit Packing Apparatus Comprising Supply Device, Means to Release Filled Tray Into Carton.—E. W. Carlsen and G. L. Hunter, to Fruit Industries Research Foundation, Yakima, Wash. No. 2,797,540. July 2, 1957.

Dispensing Receptacle Having Lid With Filling Opening, Spring-Seated Valve Having Small Discharge Torque.—J. Joseph, E. Cleveland, Ohio. No. 2,798,648. July 9, 1957.

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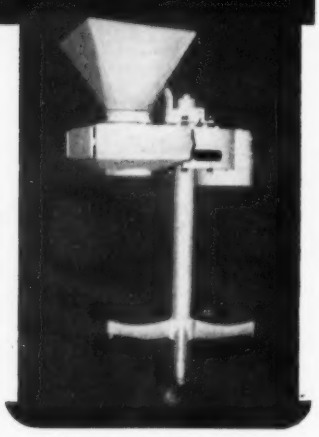

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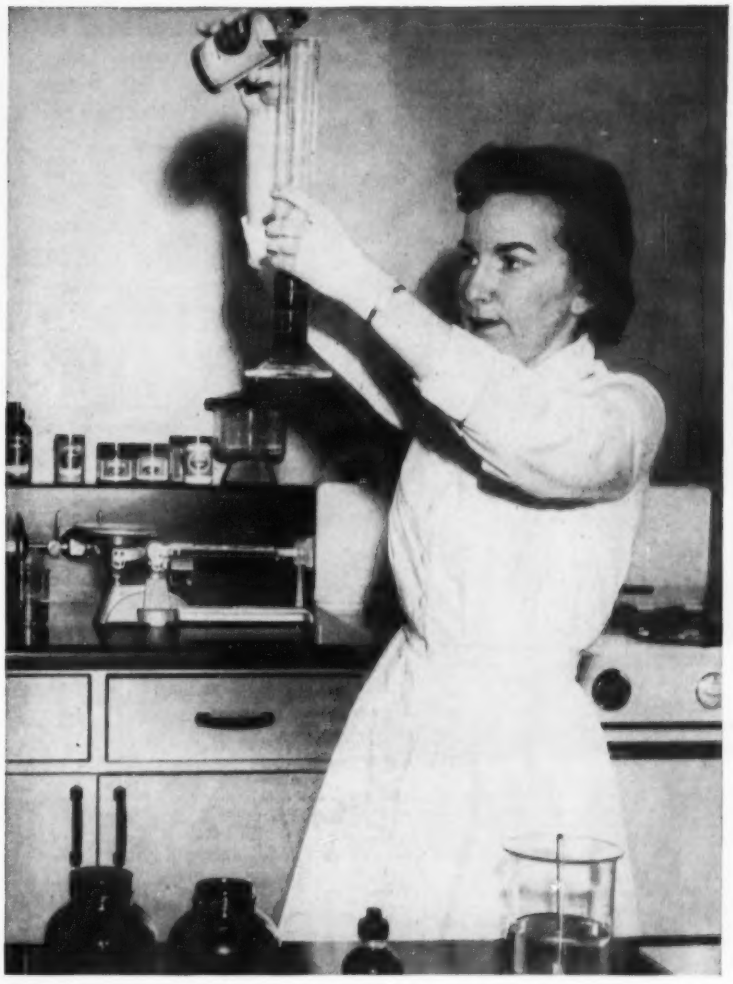

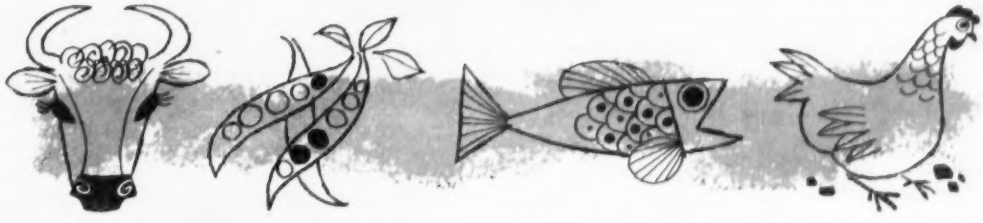

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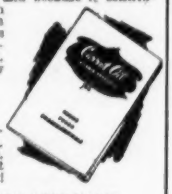

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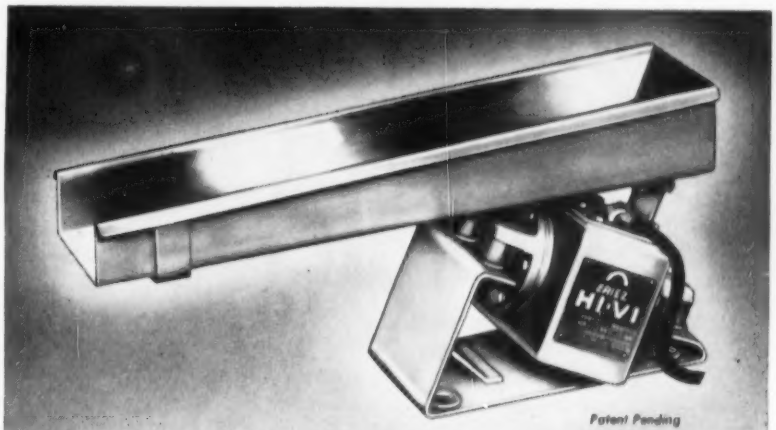

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